Blueprint “New Skills Agenda Steel”:

Industry-driven sustainable European Steel Skills Agenda and Strategy (ESSA)

Analysis of cross-European VET frame-works and standards for sector skills recognition

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Executive Summary

The convergence of European vocational education and training (VET) systems within an EU framework started gradually in the second half of the 21st century and accelerated in the 90s and early 2000s with the launch of mobility and research transnational programmes and the establishment of EQF (2008), ECVET (2009), EQAVET (2009), and the Recommendation on the validation of non-formal and informal learning (2012). The main outcomes of this process can be listed as follows:

- progressive shift to a learning outcomes approach;
- progressive establishment of a credit system and shift to a unit-based/modular approach;
- introduction of guidelines for establishing mechanisms for the recognition, validation and certification of informal and non-formal learning;
- establishment of national quality assurance systems in line with the EU requirements;
- establishment of cross-national databases and systems for mapping and cross-referencing education and vocational qualifications (e.g., ESCO, ISCO, ISCED), increasing transparency and comparability.

As regards the implementation of EU frameworks, tools and concepts in the ESSA case study countries (Germany, Italy, Poland, Spain and the United Kingdom), the current state of play can be summarised as follows:

- EQF is present in all the ESSA case study countries and National Qualifications Frameworks are referenced to this, except in Spain where the referencing process is still underway.
- ECVET appears to be the most challenging framework to adopt at the national level. However, all the ESSA case study countries have taken some steps to align at least with some of the ECVET principles. Where ECVET principles are used, this is mainly to promote and support transnational mobility and to ensure its quality.
- Quality Assurance (QA) mechanisms based on, or in line with, EQAVET are present in all the ESSA case studies. However, it is often difficult to frame a national QA system, since measures and mechanisms are implemented at different levels (national, regional, local).
- DigComp is used in the ESSA case study countries, although in different ways. It varies from being used as a reference for national digital competencies standards to being used to pilot initiatives at the regional/local level.
- All the ESSA case study countries have adopted a learning outcomes approach, in line with the EU tools and frameworks. Countries like Poland and the United Kingdom were early developers of such an approach, whereas Germany, Italy and Spain are more recent developers.
- Modularisation is mostly applied in the ESSA case study countries, however, in Italy and Germany it is applied to a lesser extent (only for some qualifications or part of them). This can be explained by the functioning of the system itself and the understanding of what a qualification is and how it is achieved.
- Arrangements for the recognition and validation of prior learning coming from informal and non-formal settings are now in place in all the case study countries, although their scope and outcomes vary. The approaches could vary from having a national framework in place to arrangements implemented only at the regional/local level.

Overall, the reviewed frameworks and tools promoted by the EU aim to reach a certain degree of harmonisation between the Member States' VET systems through making them more transparent to one another. Whilst all case study countries have taken measures to integrate such frameworks, tools and concepts in their VET systems, a perfect alignment is unlikely to be reached, due to the different starting points and VET rationales.

The transformations that the EU frameworks and tools are triggering at the national VET systems level produce a structure of potential opportunities to support workers training, up-skilling and/or re-training that steel companies could leverage once these are well understood:

a. opportunities for re-skilling through the recognition of prior learning;
b. opportunities to shorten or customise vocational paths (modularisation)
c. opportunities for quality training mobility (e.g., ECVET);
d. opportunities for benchmarking (e.g. DigComp, e-CF).

Flexibility has become an important requirement of VET paths to allow learners to re-skill and upskill, or change their professional trajectories if needed. Flexible VET systems are now required to take into account the role of informal and non-formal learning and to establish mechanisms to recognise and validate this, thus offering learners the opportunity to shorten their training paths.

ECVET mobility tools support the formal recognition of learning achievements during a mobility period. From the point of view of VET providers, ECVET could favour the establishment of solid trans-national mobility partnerships. This would be particularly beneficial within sectoral domains. Companies could benefit from ECVET through targeting specific learning outcomes to be achieved abroad (e.g. in relation to Industry 4.0).

Specific tools for ICT, such as DigComp and the e-CF framework could work as shared glossaries and competencies references at the European level and could be useful as proficiency benchmarks for companies as well as training providers when designing their own training offer.

Modularisation can support the steel industry through the creation of tailor-made curricula, that respond to specific skills needs. A modular approach, combined with established paths for the recognition of informal and non-formal learning, enhances the flexibility of VET programmes and would allow steel workers to upskill or re-train more easily if needed. The advantages of this could consist of:

a) increased flexibility of vocational paths;
b) shortened distance between IVET and CVET;
c) easier recognition and transferability across countries of single modules;
d) easier updating of the qualifications;
e) possibility to ideally combine core national modules with local and/or sectoral requirements.

However, the emphasis on modularisation requires a caveat. Research conducted so far points to the need of a holistic approach to vocational training to increase steel workers' adaptability to changing conditions, especially in a context of fast technological transformation. Vocational qualifications need to provide a set of interrelated (technical and transversal) competencies in broad occupational areas to cope with the challenges brought in by the fourth industrial revolution. From this point of view, modularisation should not be put in practice in a way that hinders a holistic approach to education and training and reduces the breadth of professional competence, but rather in a way that complements it.

SECTION I – Description and rationale of the deliverable

1.1 Description of the deliverable

The following report focuses on cross-European VET frameworks and standards for sector skills recognition. It is one of the five outcomes of WP4 – *VET Requirements and Regulations/National VET Systems (relevant requirements and regulations for the Blueprint)* and is intended as complementary to the other deliverables produced under this work package.

This report provides an overview of the most relevant tools and frameworks devised and implemented at the EU level to support the transparency and transferability of qualifications and competencies among the EU countries.

In a context of increasing transnational mobility and economic interdependency, transparency and cross-referencing of qualifications awarded in different countries are crucial for the successful transferability of skills and competencies.

The report is structured into four sections, as follows:

i. Description and rationale of the deliverable
ii. The emergence of a European VET framework
iii. European tools and frameworks for harmonising national VET systems
iv. Summary of the findings and concluding remarks and recommendations

In the first section, the main contents and rationale of the report are outlined. The second section describes the path and the steps that have been made towards a progressive integration of vocational education and training (VET) on a European level and the emergence of a coherent and unitarian European VET framework through which the national systems are connected and harmonised. Here, we also highlight the trends described by the most recent EU VET policies and offer a snapshot of the most common transformations occurring in the national systems.

In the third section, we review the most relevant frameworks and tools developed for supporting transparency and integration. Although the focus is mainly on EU instruments (e.g., EQF, ECVE, EQAVET, DigComp, etc.), the section also offers a brief review of other international tools that support VET harmonisation and transparency (e.g., ISCED and ISCO).

The fourth section contains a summary of the findings concerning the impact of EU tools and frameworks on national VET systems and describes the transformations occurring at the European and national levels.

1.2 Rationale

The general aim of WP4 is to understand how VET systems, at both the national and European level, currently deliver skills and competencies to the steel industry and to understand where informal training (on the shop floor) attempts to close the gaps in formal VET provision. More specifically, WP4 is intended to:

a) establish the relevant regulatory framework for VET systems in five member states, as applies to the steel sector

b) explore how VET national systems harmonise at the EU level

c) understand to what extent cross-EU frameworks (e.g., EQF, EQAVET, ECVET, etc.) support the comparability of (steel-related) vocational qualifications.

Within this general framework, the specific purpose of D4.2 is to establish how Europe-wide instruments, programmes and frameworks currently serve the steel industry and how they might be further leveraged for meeting the industry skills requirements and talents mobility.

As mentioned at the onset, this Deliverable is to be considered strictly connected with (and complementary to) Deliverables 4.1, 4.3 and 4.4. These deliverables, indeed, focus on different aspects of VET systems and intend to offer in-depth studies of such aspects. All the insights emerging from these reports are collected in Deliverable 4.5 which is devised as a summary of the findings of the entire work package and an organic collection of recommendations on how the industry can best use the opportunities that the different systems provide and contribute to overcome their shortcomings. Such insights and recommendations will inform the ESSA Blueprint strategy.

To support the industry from a European perspective, it is important to provide accessible windows of opportunities for workers' mobility and encourage the exchange of information on vocational education and training and related qualifications. This, in turn, requires that national VET systems are harmonised and integrated into an overarching framework that guarantees transparency and comparability to national vocational programmes and qualifications.

SECTION II – The emergence of the EU VET framework

2.1 From divergence to convergence

2.1.1 Introductory remarks

An effort by the European institutions to harmonise and integrate the national VET systems within an overarching European meta-framework has been made for many years and still the process cannot be considered entirely complete (Cedefop 2016).

The EU institutions have supported this process through the creation of specific policies and instruments, as well as funding research and pilot projects on the implementation and effectivity of such instruments in the different national contexts, as shown by the former Leonardo da Vinci programme and the current Erasmus+ and Horizon2020 programmes.

Before retracing the process through which this meta-framework has been designed and gradually implemented by the EU countries, however, it is important to highlight some of the criticalities that emerged both at a conceptual and methodological level, related to the comparison, transferability and harmonisation of components from different contexts.

A first issue is linked with the very concept of skill that is a core component of many education and training systems (see paragraph 2.3 for a discussion of the different understandings of *skill* and *competence* and their significance for the ESSA project). Clarke and Winch (2006) argue that the concept of skill brings with it different understandings in different contexts and that a first obstacle in harmonizing different education and training systems is to overcome this ambiguity: assessing skills differences depends "on our ability to understand what is meant by the term 'skill' and whether the term can be adequately translated into different European languages. Without a common understanding, it is questionable whether 'skills' can be compared across societies" (Ibidem, p. 256).

The authors refer to the different understanding of skills in the German and in the Anglo-Saxon context as a paradigmatic example of how the concept encapsulates different features. In the Anglo-Saxon context, the notion of skill is not far from that of *know-how* and *technique*, its primary location is to be found in those activities requiring manual or physical dexterity and coordination and can only be demonstrated through its application in some specific performance. Another important characteristic of this understanding is that it does not directly link the possession of a specific skill set with the possession of a professional qualification. This last feature establishes a crucial difference with the German context, where there is no actual distinction between skill and qualification, as a skilled worker is also a qualified worker. Furthermore, the German concept of skill entails that the worker has acquired thorough knowledge and understanding of a specific industrial context (so it is not linked with a unique job but can be easily applied in different jobs within the same field), this implying also social recognition and a specific wage level. All these characteristics are not part of the Anglo-Saxon concept, as it describes a more specific, task-oriented quality of the worker, recognised only within the specific context of the job and with no actual relation with social status and wage.

Clarke and Winch conclude that, in the German context, a qualification represents a criterion of industrial ability within a specific sector and is a socially recognised guarantee that the

worker possesses all the knowledge and competence associated with a specific "*Beruf*"[1], while in the Anglo-Saxon context, a skilled worker has usually a narrower set of skills and abilities and these are not necessarily underpinned by a theoretical knowledge that can be spent in different jobs within the sector.

Similarly, a study by Turbin (2001) showed how the process of policy borrowing and transfer (as it was done, for instance, through international programmes, as the World Bank programmes, and their reliance on human capital theory[2]) is not straightforward, as it represents a form of "cultural borrowing", and can be sometimes totally ineffective due to structural differences between the countries. Turbin pointed out that "where transfer does occur and produces some success, it usually goes through a process of adaptation and implementation that includes tailoring basic principles to the receiving environment and then monitoring the process and intervening where appropriate" (Ibidem, p. 107).

2.1.2 A brief historical excursus[3]

Vocational education and training followed in pre-modernity similar patterns in most of European countries, in particular because of the influence of guilds. The industrial revolution signed a break in this common development, with the abandonment of the traditional guild-led apprenticeships and the opening up for national systems of vocational education and training. From the 12th to the 18th century, the guilds imposed a strict set of rules about the requirements for membership and the training of apprentices and journeymen. The guilds also provided a stable hierarchy within crafts made of three levels, apprentice, journeyman and master: "the title of master was the only written evidence of competence, while 'certificates of apprenticeship' confirmed completion of the first stage of training (Cedefop 2004, p. 7). Even during the Middle Ages, mobility was an important mechanism to refine skills and acquire further knowledge. Journeyman vocational qualifications were recognised abroad thanks to the guilds' networks and journeymen could travel from one place to another to learn from masters, to become masters themselves.

After the spread of the liberal philosophy with its influence on political and economic doctrines, the guild system started losing its importance as a solid framework for organizing and regulating vocational education and training. The idea of the "free play of forces" promoted by liberal thought brought to frame guilds as an obstacle and a constraint to economic competition and market freedom.

Besides the influence of liberalisms, the end of the guild system was also caused by two more complementary factors, the wake of political upheavals and the different pace of industrialization in the various European countries. These caused a deep reconfiguration of the previous social order and allowed for the emergence of clear differences between the European countries. In consequence of this, in the early 20th century, three main models emerged for vocational education and training: the British liberal market model, the German dual corporate model, and the French state-regulated model (Table 1)[4].

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[1] The concept of *Beruf*, made famous in social sciences by Max Weber's classic work on the "spirit of capitalism", entails a double understanding of profession and vocation, implying a more complex link with the inner socialization of the individual and with societal structures than the concept of "job".

[2] See Deliverable 4.1, paragraph 2.1.

[3] This paragraph is a summary of Cedefop (2004), "From divergence to convergence A history of vocational education and training in Europe, in European Journal of Vocational Training, N. 32, pp. 6-17.

[4] The table partially overlaps with the categorization produced in D4.1, though the aim of Table 1 is to provide an overview of three classical approaches to vocational education and training from a historical perspective, while

Table 1 – Classical models of vocational education and training in Europe

	Liberal market model (Britain)	State-regulated model (France)	Dual corporate model (Germany)
Who determines how vocational education and training is organised?	Negotiated 'in the market place' between representatives of labour, management, and providers of vocational education and training	The State	State-regulated chambers of craft trades, arranged by profession
Where does vocational education and training take place?	There are many options: in schools, in companies, in both schools and companies, via electronic media, etc.	In special schools, so-called 'production schools'	In predetermined alternation between companies and vocational schools ('dual model').
Who determines the content of vocational education and training?	Either the market or the individual companies, depending on what is needed at the moment. The content is not predetermined.	The state (together with the social partners). It does not aim primarily to reflect practice in enterprises, but relies instead on more general, theoretical training.	Entrepreneurs, unions, and the state jointly decide.
Who pays for vocational education and training?	As a general rule, the people who receive the vocational education and training are also the ones who pay for it. Some companies finance certain courses, which they themselves provide.	The state levies a tax on companies and finances vocational education and training, but only for a certain number of applicants each year.	Companies finance training within the enterprise and can set off the cost against tax. Trainees are paid a contractually determined sum. Vocational schools are financed by the state.
What qualifications are gained at the end of vocational education and training, and to what opportunities do these qualifications lead?	There is no monitoring of training, nor are there universally accredited final examinations.	There are state certificates which also entitle the best graduates to go on to higher courses.	The qualifications are generally recognised as entitling their holders to work in the relevant occupation and to go on to higher courses.

Source: Cedefop 2004

The European VET systems' path to convergence started again in the mid-21st century, when the governing body of the European Coal and Steel Community started to pay attention to vocational education and training as a way to improve job safety, especially in the mining sector. Later, the Rome treaty of 1957 established in article 118 that the Commission shall have the task of promoting close cooperation between the Member States in various social fields, includ-

the aim of the categorisation produced in D4.1 is to categorise the 5 case study countries based on their economic model, type of skills formation system and functioning.

ing basic and advanced vocational training. Indeed, "joint action in the field of vocational education and training was identified as a precondition for the free mobility of the workforce and the exchange of young workers within the EEC" (Ibidem, p. 15).

During the Sixties and the early Seventies, the idea of a common European framework for VET was slow to develop because of the obstructionism of some countries concerned about the replacement of their well-established training programmes and paths. A clear sign of the will of the EEC to push the convergence of national VET systems was the establishment in 1975 of Cedefop (European Centre for the Development of Vocational Training). Another push in the late Eighties, with the launch of the first Erasmus programme, aimed at supporting pilot students exchanges across Europe, and again in 1995, with the launch of specific VET transnational programmes, such as the Leonardo da Vinci (1995-2013).

In March 2000, the Lisbon European Council ratified that "Europe's education and training systems need to adapt both to the demands of the knowledge society and the need for an improved level and quality of employment", and that "a European framework should define the new basic skills to be provided through lifelong learning"[5]. In the same document, the Council also reported the need for "a general reflection on the concrete future objectives of education systems, focusing on common concerns and priorities while respecting national diversity"[6].

The Copenhagen Declaration of November 2002 (see Table 2) set an important milestone in the path to the convergence of national VET systems. It laid down plans for building a true European labour market through mutual recognition of vocational qualifications and improving national VET systems (Coles and Oates 2005). The Copenhagen Declaration stated the importance of high-quality VET in promoting social inclusion, cohesion, mobility, employability and competitiveness, and maintained the need for the EU Member States to increase voluntary cooperation to promote, mutual trust, transparency and recognition of competencies and qualifications.

The process culminated in the development of the European Qualifications Framework (EQF) "intended to serve as a mechanism enabling comparability between national qualification systems, thus enhancing transferability and mobility of labour" (Brockmann et al. 2008, p. 548).

Table 2 – Axes of the Copenhagen Declaration (2002)

European dimension	Strengthening the European dimension in vocational education and training with the aim of improving closer cooperation to facilitate and promote mobility and the development of inter-institutional cooperation, partnerships and other transnational initiatives, all in order to raise the profile of the European education and training area in an international context so that Europe will be recognised as a world-wide reference for learners.
Transparency, information and guidance	Increasing transparency in vocational education and training through the implementation and rationalization of information tools and networks, including the integration of existing instruments such as the European CV, certificate and diploma supplements, the Common European framework of reference for languages and the EUROPASS into one single framework.
	Strengthening policies, systems and practices that support information, guidance and counselling in the Member States, at all levels of education, training

[5] http://www.europarl.europa.eu/summits/lis1_en.htm.
[6] Ibidem.

	and employment, particularly on issues concerning access to learning, vocational education and training, and the transferability and recognition of competences and qualifications, in order to support occupational and geographical mobility of citizens in Europe.
Recognition of competences and qualifications	Investigating how transparency, comparability, transferability and recognition of competences and/or qualifications, between different countries and at different levels, could be promoted by developing reference levels, common principles for certification, and common measures, including a credit transfer system for vocational education and training.
	Increasing support to the development of competences and qualifications at sectoral level, by reinforcing cooperation and co-ordination especially involving the social partners. Several initiatives on a Community, bilateral and multilateral basis, including those already identified in various sectors aiming at mutually recognised qualifications, illustrate this approach.
	Developing a set of common principles regarding validation of non-formal and informal learning with the aim of ensuring greater compatibility between approaches in different countries and at different levels.
Quality assurance	Promoting cooperation in quality assurance with particular focus on exchange of models and methods, as well as common criteria and principles for quality in vocational education and training.
	Giving attention to the learning needs of teachers and trainers within all forms of vocational education and training.

The strategic framework for European cooperation in education and training (ET 2020)[7] adopted by the Council in May 2009, in continuity with the Lisbon strategy, recognised the challenges posed by demographic change and the need to develop a lifelong approach to education and training. The document provides a strategic framework for European cooperation in education and training up to 2020, building on the achievements of the earlier education and training 2010 initiative (ET 2010) and setting out 4 strategic objectives to help every citizen to realise their full potential and to create sustainable economic prosperity in Europe. The first strategic point, titled "Making lifelong learning and mobility a reality", underlines the importance of ensuring National Qualification Frameworks (NQF) based on learning outcomes[8] and linking them to EQF to favour the transition between different education and training sectors, openness towards informal and non-formal learning, transparency and recognition of learning outcomes.

The EU VET convergence strategies outlined above are supported by trans-national programmes favouring mobility and transfer of innovation and good practices such as the former Leonardo da Vinci programme (1995-2013) and the Erasmus+ programme launched in 2014 (see section 3.7).

[7] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:ef0016

[8] The ECVET Recommendation defines learning outcomes as statements of what a learner knows, understands and is able to do on completion of a learning process and which are defined in terms of knowledge, skills and competence.

2.2 EU VET Policy Direction

Information regarding occupations, qualifications, skills, competencies, levels and so on can only be compared across the European Member States if all share a set of common principles and guidelines. These need to be based, in turn, on a common language. Since early 2000, the EU institutions have pointed in this direction.

Since the introduction of EQF, ECVET and EQAVET the member states have undergone relevant changes in the way their VET systems are organised, gradually harmonising with the principles and guidelines promoted by the aforementioned frameworks. The main changes can be summarised in the following 5 aspects (EC 2019):

a) Shift to a learning outcomes approach
b) Shift to a unit-based/modular approach
c) Establishment of credit systems
d) Introduction of mechanisms for the recognition and validation of informal and non-formal learnings
e) Establishment of Quality Assurance systems

The tools/frameworks and policies that have underpinned and accompanied this transition are reviewed more in detail in section III. Here we aim to offer a first outline of the most common transformation that national VET systems have undergone:

2.2.1 Learning outcomes approach

EQF and ECVET and the Recommendation on the recognition of non-formal and informal learning have encouraged a shift in the Member States to a description of qualifications in terms of learning outcomes[9]. In particular, the EQF Recommendation of 2008 and the ECVET Recommendation of 2009 "served as an important catalyst for a comprehensive shift towards learning outcomes-based systems across the entire European Union" (EC 2019, p.34). The process has brought a certain degree of convergence across the EU countries and, at present, practically all member states have put in place related policy initiatives (EC 2019).

Cedefop (2012c) has grouped the EU countries in two groups based on the period of adoption of a learning outcomes approach. Within the ESSA five case study countries, the United Kingdom and Poland were classified as "early developers", while Germany, Italy and Spain are "recent developers". However, it has been pointed out that despite such convergence, there are differences in the way the countries describe learning outcomes (Cedefop 2017; EC 2019).

2.2.2 Modular approach

The shift towards learning outcomes is integrated by a modular approach to increase the flexibility of VET paths, both from the point of view of labour market and from the point of view of learners (EX 2019). Modularisation can support the creation of tailor-made curricula, that respond to specific skills needs. In 2018, 21 EU countries had already introduced module-based

[9] As it will be clarified further, while the traditional teaching paradigms focused on the initial phases of the training process (inputs), the new approach focuses on the outcomes that the individual is able to produce at the end of the learning process.

qualifications in IVET, including Spain, Poland and the United Kingdom. Other 4 countries, including Germany and Italy, had introduced modular structures only in relation to some qualifications, or parts of qualifications (Ibidem). As it was remarked, "several Member States not using modules or unit-based approaches have strong work-based apprenticeship" (EC 2019, p. 36), as exemplified by the case of Germany. This points to a practical as well as theoretical difficulty to break down certain (holistic) training approaches into separate modules and units. In particular, modularised curricula seem to be more difficult to introduce in those dual systems in which trade unions play a greater role.

Finally, it has been remarked that in those countries in which modularisation is well-developed, VET tends to be more flexible. However, this does not guarantee that whole qualifications can be acquired by separately accumulating modules or units (EC 2019).

2.2.3 Credit systems

Credit systems are devised as instruments to support both modularisation and the acquisition of learning outcomes (through formal as well as non-formal and informal learning), and to facilitate their transfer across different learning contexts. In those countries in which VET credit systems are in place, units of learning outcomes can be assessed, recognised and accumulated (as well as transferred within the country, while international recognition is currently possible in a smaller number of countries). In general, a credit system can operate by describing a VET programme and attaching credit points to each component (modules, placements, dissertation work etc.), or by describing a qualification in terms of units of learning outcomes and attaching credit points to each unit. The number of countries with a credit system in place has gradually increased from 8 in 2013 to 17 in 2018, although such credit systems are not necessarily based on ECVET. Within the ESSA case study countries, Spain and the United Kingdom were reported to have in place a credit system for VET since 2013, while Poland was reported to have ongoing developments in 2018 (EC 2019). In most of the countries with a credit system in place, it is possible to have learning outcomes assessed, recognised and validated within the national system.

2.2.4 Validation of non-formal and informal learning

Flexible VET systems need to consider the role of informal and non-formal learnings and to establish mechanisms to incorporate these into VET systems, thus offering learners the opportunity to shorten their paths through the recognition and validation of prior learning and the exemption of some modules. A Cedefop (2019b) report on European inventory on validation of non-formal and informal learning shows that, in 2018, validation arrangements were available in at least one of the three broad areas (education and training, labour market and third sector) in all the 36 countries investigated (with validation arrangements most commonly in place across the education and training area). However, the countries are progressing at a different speed in the establishment of comprehensive validation arrangements. The five ESSA case study countries appear all to have in place arrangements for the validation of learning (although the scope of these differ, see paragraph 3.5)

2.2.5 Quality assurance

The EQAVET platform has provided a common ground in terms of quality standards for VET systems. These have also fostered a convergence among EU countries in terms of quality assessment. Th EQAVET recommendation identifies four steps in assuring quality criteria in education and training and the corresponding descriptors at VET system and VET providers' level. Namely, the quality indicators require that planning should reflect a strategic vision shared by the relevant stakeholders and should include explicit objectives, actions and indicators; that implementation plans are devised in consultation with stakeholders and include explicit principles; that the evaluation of outcomes and processes is regularly carried out and supported by measurement; finally, it requires that the overall processes are systematically reviewed[10]. More detailed information on the state of play of EQAVET in the ESSA case study countries can be found in paragraph 3.4.

2.3 Skills, competencies and learning outcomes. A conceptual framework

Before reviewing the tools and frameworks developed by the European Union to harmonise and make transparent and comparable the Member States' vocational systems, it is important to clarify the meaning of some concepts that are at the very foundations of such frameworks and reflect on their relevance for the ESSA project.

As clarified also in Deliverable 4.1, we draw on the Glossary[11] produced by Cedefop to ensure consistency of meaning throughout the project. In particular, we define a *skill* as the ability to carry out the tasks and duties of a given job and is more specifically as the "ability to apply knowledge and use know-how to complete tasks and solve problems" (Cedefop 2014, p. 227).

We define *competence* as the ability to apply learning outcomes in a defined context or to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development (Ibidem, p. 47).

As already noted in section 2.1.1, however, the concepts of skill and knowledge are extensively debated and the definition provided above is selected to fit narrowly with the aims and objectives of the ESSA project.

Looking at the scientific literature it seems possible to distinguish VET systems based on the understanding of such concepts and how these underpin the rationale and aims of the system. Following Rauner (2006, cit. in Brockmann et al. 2008), a first fundamental distinction could be traced between systems that train for an occupation and systems aimed at the employability of individuals. We can distinguish between systems that focus on education for an occupation (i.e. Germany) and in this way inputs of occupational competence (theoretical knowledge and workplace learning) – ultimately evidenced by qualifications – and systems based narrowly on certification of competencies by engaging in a market of qualifications (e.g. UK), which is more output focused.

In this respect, the two best examples among the ESSA case studies would be the German and the British VET system. In the first case "VET is integrated into a comprehensive school system

[10] Paragraph 2.3.6 provides a more accurate description of EQAVET principles.
[11] https://www.cedefop.europa.eu/en/events-and-projects/projects/validation-non-formal-and-informal-learning/european-inventory/european-inventory-glossary

and is designed to achieve ability to act competently within an occupational field. […] In the second model, a 'market of qualifications' enables individuals to enhance their employability through certification of competencies, acquired either through work experience or courses in a modularised system" (Brockmann et al. 2008, p. 549). In systems that gravitate towards the first model, VET incorporates a substantial element of theoretical knowledge and general education and is well integrated into a comprehensive education system. Such systems are based on a multi-dimensional understanding of competence (le Deist and Winterton 2005) as the ability to deal with complex work situations, drawing on multiple resources that the employee brings to the workplace. In such contexts, competence development goes hand in hand with the development of an occupational identity (*Beruf*) and aims to strengthen workers' autonomy and capacity to reflect on their own actions. On the other end of the spectrum, systems aiming at employability, like the British one, are underpinned by the notion of skill, which can be traced back to the craft-based system of apprenticeship, where an apprentice would be expected to learn certain task-specific skills on the job, with one particular employer, and with little theoretical underpinning (Clarke 1999, cit. in Brockmann et al. 2008). In such contexts, skills development is rather specific to a job and accompanied by a little knowledge base. In this respect, Delamare le Deist and Winterton (2005) speak of a functional-behaviourist model in which the learner plays mostly a passive role, being only required to demonstrate the capacity to perform to standards. As pointed out by Brockmann et al. (2008), in such contexts the terms competence and skill are mostly interchangeable.

Moving from systems foundational concepts to outputs, learning outcomes are defined within the EQF framework as statements of what a learner knows, understands and is able to do on completion of a learning process and are described in terms of knowledge, skills and competence. However, Cedefop (2017) clarifies that "competence can be understood as actually achieved learning outcomes, validated through the ability of the learner autonomously to apply knowledge and skills in practice, in society and at work" (p. 31). Cedefop also reports that the term competence in some countries substitutes the term learning outcomes (e.g., Italy, see Deliverable 4.4).

Within the ESSA project, the Deliverables produced make use of the different concepts outlined above in relation to different aspects. Although the concept of competence is more holistic and at the very core of the EU frameworks and tools, companies rarely refer to competencies needs but rather to skills needs (which are more specific and measurable). In this respect, ESSA being an industry-led project, an important task is to assess skills needs and gaps in the same way companies do (we might call this a bottom-up, or micro-level perspective). Thus, focusing on skills to identify gaps is an attempt to align with companies' terminology and practices. On the other hand, the concepts of competence and learning outcomes come much more to the surface when analysing national VET programmes and the integration of EU tools and frameworks in the national VET systems (top-down, or macro-level perspective).

SECTION III – EU Tools and Frameworks

3.1 European tools for cross-matching and transferability of qualifications and competencies

The process that began in March 2000 with the Lisbon European Council and went through the 2002 Copenhagen Declaration led to establishing the need for a European dimension of education and training to face the challenges brought by the new labour market dynamics and has acknowledged the need to develop and experiment new cross-European tools to harmonize and link national education and training systems. In this perspective, the primacy of formally acquired learning was somehow limited by the affirmation of the relevance of learning acquired also in non-formal and informal contexts[12].

Following this, the attention given to the subsequent interventions of the European Commission focused on the principle of capitalization of competencies acquired in different contexts (formal, informal and non-formal).

Tools such as the European Qualification Framework (EQF) and the European Credit System for Vocational Education and Training (ECVET)[13] see their *raison d'être* in the need to re-establish workers' flexibility on common, standardised and transparent bases, to support workers in the continuous usability of their skills and abilities. The term flexibility is here used in a broad meaning, including also mobility (both geographical and between different learning environments, professional paths and training systems).

In this context, EQF and ECVET were designed to support the paradigms of *lifelong and lifewide learning*[14] to raise the level of skills and competencies of the EU workers (and consequently their competitiveness) and to help them navigate the European labour market.

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[12] Informal learning is intended as learning resulting from daily activities related to work, family or leisure and not organised or structured in terms of objectives, time or learning support. Informal learning is usually unintentional from the learner's perspective (Cedefop 2014). Non-formal learning is a way of learning embedded in planned activities which are anyway not explicitly designated as learning (in terms of learning objectives, learning time or learning support). Non-formal learning is usually intentional from the learner's point of view (*Ibidem*). See also, COUNCIL OF THE EUROPEAN UNION, *Common European Principles for the identification and validation of non-formal and informal learning*, May 2004, Brussels.

[13] The rationale behind these devices is the same that of tools such as the *European Quality Assurance in Vocational Education and Training* (EQAVET) and EUROPASS. All these tools are part of a macro strategy to support, guarantee and make more effective mobility and flexibility of workers.

[14] *Lifelong learning* encompasses "all learning activity undertaken throughout life, which results in improving knowledge, know-how, skills, competences and/or qualifications for personal, social and/or professional reasons" (Cedefop 2014, p.171), while *lifewide learning* entails "learning, either formal, non-formal or informal, that takes place across the full range of life activities (personal, social or professional) and at any stage of life" (Ibidem, p. 172).

3.2 European Qualification Framework (EQF)

The European Qualification Framework was designed as a framework for supporting transparency and for making educational and vocational qualifications more comparable across the EU countries.

The EQF Recommendation of April 2008 clarifies that the term *qualification* refers to the "formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards"[15]. In this definition, not only strictly vocational qualifications are included, but the entire set of qualifications and certificates delivered by the education and training systems of the EU countries.

EQF was designed as a meta-framework[16] based on learning outcomes (proved by the possession of specific knowledge, skills and abilities) and articulated in 8 progressive levels. The EQF framework allows for the mapping of all the qualifications issued in the member countries, thus ensuring the transparency of these qualifications in any context and an effective reference for supporting mobility.

In the same Recommendation, learning outcomes are defined as "statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence"[17]. This definition makes clear the shift with respect to traditional education and training models. If the previous paradigms focused on the initial phases of the training process, i.e. on the inputs transmitted to the learner, the new paradigm promoted by the European Commission focuses instead on the outcomes, placing the individual at the centre of the training process, who must be able to manage in an autonomous, open and permeable way his skills and competences' development[18].

In May 2017, a revised and strengthened Recommendation was adopted to ensure the continuity as well as the deepening of EQF[19]. Here is recommended that the member states[20]:

a) use EQF to reference national qualifications frameworks and to compare all types and levels of qualifications in the Union that are part of national qualifications frameworks by referencing their qualification levels to the EQF levels;
b) take measures so that all qualification documents newly issued by the competent authorities, and/or registers of qualifications, contain a clear reference to the appropriate EQF level;

[15] Recommendation of the European Parliament and of the Council of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning.
[16] The EQF does not aim to be a duplication at a European level of national systems but, rather, a "container" of the individual National Qualification Frameworks (NQFs). It aims to reconnect them into a coherent whole and make them readable to each other and comparable with one another.
[17] Recommendation of the European Parliament and of the Council of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning.
[18] The approach chosen by the Commission draws on a liberalist understanding of the labour market which is not free from criticisms as the idea of putting the individual at the very centre of the learning process moves to some extent the responsibility of the effectivity of education and training (and resulting opportunities in terms of employment) from the State to the individual.
[19] www.cedefop.europa.eu/en/events-and-projects/projects/european-qualifications-framework-eqf
[20] Council Recommendation of 22 May 2017 on the European Qualifications Framework for lifelong learning and repealing the recommendation of the European Parliament and of the Council of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning

c) encourage the use of EQF by social partners, public employment services, education providers, quality assurance bodies and public authorities to support the comparison of qualifications and the transparency of learning outcomes;
d) promote links between credit systems and national qualifications frameworks to make use of credit systems and relate them to national qualifications frameworks.

Table 3 – EQF levels descriptors

Levels	Knowledge	Skills	Responsibility & Autonomy
1	basic general knowledge	basic skills required to carry out simple tasks	work or study under direct supervision in a structured context
2	basic factual knowledge of a field of work or study	basic cognitive and practical skills required to use relevant information to carry out tasks and solve routine problems using simple rules and tools	work or study under supervision with some autonomy
3	knowledge of facts, principles, processes and general concepts, in a field of work or study	a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	take responsibility for completion of tasks in work or study adapt own behaviour to circumstances in solving problems
4	factual and theoretical knowledge in broad contexts within a field of work or study	a range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	exercise self-management within the guidelines of work or study contexts that are usually predictable supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities
5	comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge	a comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems	exercise management and supervision in contexts of work or study activities where there is unpredictable change review and develop performance of self and others
6	advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts take responsibility for managing professional development of individuals and groups
7	highly specialised knowledge, some of which is at the forefront	specialised problem-solving skills required in research	manage and transform work or study contexts that are complex,

	of knowledge in a field of work or study, as the basis for original thinking and/or research critical awareness of knowledge issues in a field and at the interface between different fields	and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	unpredictable and require new strategic approaches take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
8	knowledge at the most advanced frontier of a field of work or study and at the interface between fields	the most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice	demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research

Source: Council Recommendation 22 May 2017

Table 4 – Implementation of EQF in the ESSA case study countries

Country	Scope	Levels	Level descriptors	Linked to EQF
Germany	Comprehensive NQF for lifelong learning; includes qualifications from general education, VET (initial VET and regulated further training), and from higher education. DQR qualifications database: https://www.dqr.de/content/2316.php	8	• Professional competence (knowledge and skills) • Personal competence (social competence and autonomy)	2012
Italy	Designed as a comprehensive framework; it will include all levels and types of qualification from formal education and training and regional qualifications. The Atlas of work and qualifications: https://atlantelavoro.inapp.org	8	• knowledge • skills • autonomy and responsibility	2013
Poland	Comprehensive NQF including all levels and types of qualification from formal education and training. Open to regulated and non-statutory qualifications awarded outside formal education and training. Integrated qualifications register:	8	• knowledge • skills • social competence	2013

	https://rejestr.kwalifikacje.gov.pl/en/			
Spain	Designed as a comprehensive NQF for lifelong learning; will include all levels and types of qualification from formal education and training. Qualifications in the formal education system: https://www.educacionyfp.gob.es	8 (proposed)	• knowledge • skills and abilities • competence	//
United Kingdom (Eng and NI)	Regulated qualifications framework (RQF) covering all regulated general/academic and vocational qualifications and a framework for higher education qualifications (FHEQ). https://register.ofqual.gov.uk/	8 (plus 3 entry levels at EQF 1 and below)	• Knowledge and understanding • skills	2010 (updated in 2019)
United Kingdom (Scotland)	Comprehensive credit and qualifications framework (SCQF) including all levels and types of qualification. http://www.scqf.org.uk/	12 (lev 1-2 below EQF 1)	• knowledge and understanding • practice: applied knowledge, skills and understanding • generic cognitive skills • communication numeracy and ICT skills • autonomy, accountability and working with others	2010 (updated in 2018)
United Kingdom (Wales)	Credit and qualifications framework of Wales (CQFW) including all level and types of qualification. It consists of three pillars: regulated qualifications, HE qualifications and lifelong learning.	8 (plus 3 entry levels at EQF 1 and below)	• Knowledge and understanding • skills	2010 (updated in 2019)

Source: Cedefop 2020; Cedefop 2019a.

The latest Cedefop (2020) briefing note on National Qualifications Frameworks development reports that a total of 39 countries currently participate in the EQF process. Countries have also broadened the scope of their National Frameworks and most of these now include all nationally recognised qualifications from VET, general, higher and adult education. 33 countries have already successfully linked their NQF and included qualifications to EQF levels (as reported earlier, Spain is the only ESSA country that has not yet completed this process). Furthermore, 36 countries are widening their Frameworks to include also qualifications awarded outside formal education and training by private providers: among the ESSA case study countries, Poland

and UK-Scotland have already undergone such process. In addition, the number of countries that have in some way linked non-formal and informal learning to their NQF has increased from 12 in 2010 to 31 in 2018. All these developments go in the direction of making national VET systems' offer more transparent and comparable through the EQF which works as an overarching European hub.

3.3 European Credit System for Vocational Education and Training

ECVET can be considered as a complementary device to EQF and has been devised as an interface between the different national credit systems which, however, it never intended to replace. ECVET moves from the observation that the National Qualifications Frameworks (NQF) are characterized by structural differences in the design and delivery of qualifications and in the possibility of recognising informal and non-formal learning. Rather than converting each national system, ECVET sets the goal of making them compatible with one another, becoming an interface between the national provisions on accumulation, recognition and transfer of credits.

A credit system is an instrument designed to enable the accumulation of learning outcomes gained in formal, non-formal or informal settings, and to facilitate their transfer from one setting to another. It can be designed by describing an education or training programme and attaching credit points to its components, or a qualification using units of learning outcomes and attaching credit points to every unit (Cedefop 2014).

The rationale of adopting a credit system is to organise the process of obtaining a qualification more flexibly through its articulation in a set of modules identified by the acquisition of specific learning outcomes which, in turn, consist of a specific combination of skills, abilities and competencies. A unit of learning outcomes is defined as the "set of knowledge, skills, and/or competencies which constitute a coherent part of a qualification. a unit can be the smallest part of a qualification that can be assessed, transferred and, possibly, certified" (Ibidem, p. 124) and can be specific to a single qualification or common to several qualifications.

This approach aims to associate, in a transparent and standardized way, a quantitative description in terms of cumulable credits, with a qualitative set of skills and competencies, the possession of which is proven by the acquisition of specific learning outcomes.

The relationship between the two tools, ECVET and EQF, is given by the fact that, once both systems are fully implemented, the entire qualification and the units of learning outcomes described in terms of ECVET points should also be related to an EQF level.

The combined use of EQF and ECVET should lead to a simplification in cross-referencing the national education and training systems' provisions, as well as to facilitate the dialogue between the relevant actors of such systems. This process should also lead, in the medium term, to a more effective matching between the contemporary labour market requirements and the education and training opportunities.

The essential principles of ECVET are established in the Recommendation of the European Parliament and of the Council of 18 June 2009. Here ECVET is defined as a "technical framework for the transfer, recognition and, where appropriate, accumulation of individuals' learning

outcomes with a view to achieving a qualification"[21]. The implementation of ECVET entails the description of each qualification in terms of units of learning outcomes, which, once positively assessed, confer a certain number of credits. Furthermore, the model requires the adoption of tools such as *learning agreements* and *memorandum of understandings* that constitute written agreements on learning contents and evaluation procedures, signed by training providers and responsible institutions.

For each given qualification, the learning outcomes should be articulated in minimum clusters (units of learning outcomes), though the Recommendation does not establish a maximum or minimum number for these. A unit collects a coherent set of knowledge, skills and competences that can be assessed and validated. It is associated with a quantification in credits to which ECVET points are associated[22]. A qualification normally includes several units and the ECVET framework is designed to allow individuals to acquire it by accumulating the necessary units from different contexts, following the national regulations.

The ECVET Recommendation specifies that the units must be described in legible and understandable terms with reference to the knowledge, skills and competencies contained therein; that must be designed and organized in a coherent way with regard to the general qualification, and articulated in such a way as to allow the distinct evaluation and validation of each unit of learning outcomes. The specifications for a unit should include:

a) the title of the unit;
b) the general title of the qualification (or qualifications, if common to more than one) to which the unit refers;
c) the reference of the qualification to an EQF level (and, where appropriate, an NQF level);
d) the learning outcomes for that unit;
e) the learning outcomes' assessment criteria;
f) the associated ECVET points.

In the ECVET model, the units of learning outcomes achieved in a context can be assessed and then transferred to a different context. Here they can be validated and recognized by the competent institution as part of the requisites for the qualification that the person wishes to obtain. The procedures and general guidelines concerning the evaluation, validation, accumulation and recognition of units of learning outcomes are outlined by the competent institutions and by the partners involved in the training process. The transfer of credits based on ECVET should be facilitated by the establishment of networks and partnerships between the competent institutions.

From a practical point of view, the transfer of credits in the ECVET model can take two forms depending on whether the learning outcomes are achieved outside of established protocols (i.e. the recognition of non-formal or informal learning) or within these, in these cases, these are normally acquired in transnational mobility and formal contexts (Bonacci and Santanicchia 2010).

[21] Recommendation of the European Parliament and of the Council of 18 June 2009 on the establishment of a European Credit System for Vocational Education and Training (ECVET).

[22] A clarification on the difference between ECVET points and credits is needed. According to the June 2009 Recommendation, ECVET points are a numerical representation of the overall weight of learning outcomes in a qualification and of the relative weight of units in relation to the qualification. Credits for learning outcomes means a set of learning outcomes achieved by an individual which have been assessed and which can be accumulated towards a qualification or transferred to other learning programmes or qualifications.

As reported by Cedefop (2016), progress has been made in most of the EU countries since the first establishment of ECVET in 2009[23], and this has often been achieved together with the development of National Qualification Frameworks (NQFs) in the EU member countries. Both have contributed to the modularization of programmes in terms of units of learning outcomes and the establishment of procedures for the recognition and validation of non-formal and informal learning. The final establishment of such frameworks "could be the turning point in making VET more attractive and will enable learners to experience mobility as well as permeability with higher education" (Ibidem, p. 2).

Table 5 below shows the state of implementation of the ECVET principles in the five case study countries. Overall, it appears that stakeholders' engagement in ECVET is quite uneven and that ECVET is mostly used by VET providers as a tool to support mobility within specific projects.

Table 5 – State of ECVET implementation in the 5 case study countries in 2015

Germany	➢ Qualifications gained under the dual system are becoming more outcome-oriented, but not in the ECVET sense. ➢ It is uncertain whether an ECVET policy will be implemented as many stakeholders are skeptical whether ECVET could be compatible with the national approach to VET. ➢ Some ECVET components have been tested in IVET and CVET through EU and national projects by VET providers.
Italy	➢ VET providers actively participate in mobility actions funded by the EU programmes. Within these, learning abroad can be recognised by the home institution. Education and training providers define units of learning outcomes for mobility actions. ➢ VET and HE structures are compatible with ECVET principles. Most reforms included designing learning outcomes-based curricula and units. Higher technical education and training is organised in modules and units; training credits are recognised by HE institutions and are ECTS-compatible. ➢ The State-region agreement of January 2015 defines the indicators and procedures to certify competences and to develop a credit system for IVET and CVET in accordance with ECVET. In some regions, procedures for the certification and validation were already set up.
Poland	➢ There is growing interest among stakeholders in using ECVET as a tool to support cross-country mobility. Transfer of learning outcomes and periods of employment abroad are recognised case by case. ➢ IVET qualifications and core curricula are based on units of learning outcomes. ➢ Qualifications are awarded based on the assessment of learning outcomes (LO) conducted by external validation and certification bodies. Vocational diplomas and vocational certificates can be awarded, also based on LO acquired through non-formal or informal learning.

[23] As reported by Cedefop (2016), in 2015 seven countries had not engaged with any initiative at system level to implement ECVET. Belgium (Flemish Community), Hungary, Liechtenstein and Switzerland reported satisfaction with their current systems and the ECVET specifications seemed unclear to them; Slovakia concentrated first on developing the national qualifications register; Greece had already a law in place to support the development of a credit system in line with ECVET, but no implementations were made; Germany reported uncertainty about the feasibility of ECVET due to the skepticism of some stakeholders.

		➢ It is expected that ECVET will be implemented following the adoption of the Polish qualification framework and modernised qualification system. No decision has yet been taken on the use of ECVET credit points.
Spain		➢ Learning outcomes acquired and assessed during work placement periods abroad can be recognised subject to a learning agreement among teachers. ➢ Learning outcomes acquired and assessed abroad, related to other training modules of IVET, can be validated and recognised by a specific department of the Ministry of Education, Culture and Sport. ➢ The VET system has implemented the ECVET principles, except credit points and all VET qualifications are expressed in learning outcomes. VET programmes are designed as learning units and modules. ➢ Learning units, acquired either in the VET system or through validation of non-formal learning, are individually assessed and certified and may be accumulated towards a full qualification in IVET and CVET.
UK	**England**	➢ Cross-country mobility for VET is supported mainly through EU-funded projects. There is no legislative framework to enable automatic recognition of learning outcomes obtained abroad: awarding organisations recognise learning outcomes achieved outside their own programmes at their discretion and in accordance with the regulatory requirements for the qualification or sector. ➢ The VET system is based on learning outcomes that are combined to establish units, which are allocated credits via a national credit system. There are clear procedures for accumulation, recognition and transfer of credit. ➢ Units in VET programmes are assessed independently within qualifications and are linked to credits. ➢ No formal decision has been taken to apply ECVET to the current national system. The government has taken the decision to encourage the use of ECVET for international mobility purposes.
	Northern Ireland	➢ Learning outcomes assessed abroad can be recognised as part of pilot projects between the participating countries when satisfying the specifications set by qualifications awarding organisations. ➢ The Qualification and Credit Framework (QCF) sets out how units and qualifications should be designed (based on learning outcomes and credit) and the procedures for accumulation, recognition and transfer. ➢ Credit-based units of learning outcomes can be assessed independently within these qualifications. ➢ Validation of non-formal and informal learning varies with certification bodies and sectors and is at the discretion of the awarding organisation.
	Wales and Scotland	➢ Cross-country mobility for VET is not a specific priority and learning outcomes achieved abroad are reassessed at the national level (double assessment) due to national quality assurance measures, while complete qualifications gained can be recognised through a UK NARIC comparability statement. ➢ There are no plans for legislation related to ECVET although the essential elements are in place. ➢ Credit-based units of learning outcomes are already developed and strongly embedded in the VET system. ➢ Units are assessed independently within qualifications and are linked to credits. ➢ Validation of non-formal and informal learning varies with certification bodies and sectors and is at the discretion of the awarding body.

Source: Cedefop 2016

With regard to the uptake of two of the major principles of ECVET, Table 6 shows that while all the ESSA case study countries have moved to a description of qualifications and curricula in terms of learning outcomes, only two of them (Spain and the UK) are already equipped with a credit system that could support the transfer of units.

Table 6 – Alignment to ECVET principles in the ESSA case study countries

Country	Credit system for IVET in 2018	Shift to learning outcomes
Germany	No credit system in place	Recent developer
Italy	Credits used in some qualifications	Recent developer
Poland	No credit system (in development)	Early developer
Spain	Credit system in place	Recent developer
United Kingdom	Credit system in place	Early developer

Source: EC 2019

A report published by the European Commission, DG Employment, Social Affairs and Inclusion (EC 2019) examines the influence that ECVET has had on national policy developments and its relationship with other EU instruments. The study found that, since 2009, 21 European countries have introduced modules or units in IVET, with four additional countries having only some qualifications (or part of qualifications) modularised (including Italy and Germany). As for credit systems, since 2009, 17 countries have adopted these, although only few of them apply the concept of ECVET points. Overall, it has been reported that:

a) ECVET has contributed to better-quality mobility experiences through more effective agreement on, and documentation of, learning outcomes (using documents such as the Memorandum of Understanding (MoU) and Learning Agreement (LA). In some European countries learning outcomes undertaken abroad can contribute to the achievement of a qualification;
b) an unsolved criticality regards the fact that ECVET requires units to be assessed and certified separately for accumulation, a concept that is incompatible with the rationale of some VET systems;
c) ECVET has had little success with the use of credit points to transfer assessed learning outcomes;
d) ECVET is more often understood as a tool that supports mobility projects, rather than a tool that could be integrated at the system level to support flexible VET paths.

The study also lists a number of options that policymakers can consider to strengthening the implementation of ECVET in the Member States. The most appraised one pointed to make VET instruments part of a broader European policy framework for VET, introducing an overarching Recommendation that covers quality assurance, flexibility and recognition in VET. This would be governed by a single policy group and sub-groups would be used to take forward priority actions for particular instruments and policy areas. To support the implementation of this option the document suggests that:

i. the concept and definition of ECVET points could be removed or revised;
ii. the use of Memorandum of Understanding and Learning Agreements could be made a requirement for transnational mobility and these could be integrated into Europass;
iii. a new generation of ECVET pilot projects could promote and demonstrate how ECVET principles can be used.

3.4 European Quality Assurance in Vocational Education and Training (EQAVET)

The European Quality Assurance in Vocational Education and Training (EQAVET) is a "community of practice" in which members and experts exchange information and experiences, initiate a process of consensus building for the definition of common principles, indicators and tools for enhancing the quality of VET systems, and reach shared results, guidelines and criteria for quality assurance. EQAVET is a cross-European network made of representatives of the EU Member States, National References Points, Social Partners, scientific advisers and the European Commission[24].

In summary, EQAVET "intends that countries define a strategy to improve the systems of Quality Assurance (QA) in VET, based on a quality cycle and the use of performance indicators and provider self-assessment" (EC 2019, p.5). It operates in a collaborative mode to create a sustainable platform for quality assurance in VET[25], based on the European Quality Assurance Reference Framework (EQARF). This is done mainly by:[26]

- assisting the Member States in developing effective approaches to support the implementation of the Reference Framework
- developing a culture of quality with the help of the Quality Assurance National Reference Points;
- supporting the Member States and the European Commission in the monitoring and implementation of the Reference Framework;
- supporting the quality assurance dimension of work in EQF and ECVET.

The essential elements of EQARF have been established through the Recommendation of the European Parliament and of the Council of 18 June 2009[27]. The Recommendation suggests that the Framework should be regarded as a toolbox from which the users can choose the descriptors and indicators that are more relevant for their national systems.

EQARF breaks down the cycle of VET quality assessment into four phases (Table 7) proposing for each a series of descriptors both at the level of the national system and at the level of VET providers. Quality criteria and indicative descriptors are devised to support the Member States as they deem appropriate when implementing the Framework.

[24] https://www.eqavet.eu/About-Us/Network-Members.
[25] https://www.eqavet.eu/About-Us/Mission.
[26] *Ibidem*.
[27] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009H0708%2801%29

Table 7 – EQARF quality criteria and indicative descriptors at VET system level and use in the case study countries

Quality Criteria	Indicative descriptors at VET-system level	Always used	Some-times used	Not used
Planning reflects a strategic vision shared by the relevant stakeholders and includes explicit goals/objectives, actions and indicators.	Goals/objectives of VET are described for the medium and long terms, and linked to European goals.	DE, ES, IT, UK (Wls; NI)	PL, UK (En; Sct)	
	The relevant stakeholders participate in setting VET goals and objectives at the different levels.	ES, IT, PL	DE, UK (En, Sct, Wls)	UK (NI)
	Targets are established and monitored through specific indicators (success criteria).	DE, ES, UK	IT, PL	
	Mechanisms and procedures have been established to identify training needs.	DE, ES, IT, UK	PL	
	An information policy has been devised to ensure optimum disclosure of quality results/outcomes subject to national/ regional data protection requirements.	DE, ES, UK (En, Sct, Wls)	IT, PL, UK (NI)	
	Standards and guidelines for recognition, validation and certification of competences of individuals have been defined.	ES, UK	DE, IT, PL	
Implementation plans are devised in consultation with stakeholders and include explicit principles.	Implementation plans are established in co-operation with social partners, VET providers and other relevant stakeholders at the different levels.	DE, PL, UK	ES, IT	
	Implementation plans include consideration of the resources required, the capacity of the users and the tools and guidelines needed for support.	ES, IT, PL, UK(Wls,Sct,NI)	DE, UK(En)	
	Guidelines and standards have been devised for implementation at different levels.	DE, UK	ES, IT, PL	
	Implementation plans include specific support towards the training of teachers and trainers.	ES, PL, UK(En,NI,Wls)	DE, IT, UK(Sct)	
	VET providers' responsibilities in the implementation process are explicitly described and made transparent.	DE, ES, PL, UK	IT	
	A national and/or regional quality assurance framework has been devised and includes guidelines and quality standards at VET provider level to promote continuous improvement and self-regulation.	DE, ES, UK	IT, PL	

Evaluation of outcomes and processes is regularly carried out and supported by measurement.	A methodology for evaluation has been devised, covering internal and/or external evaluation.	ES, PL, UK	DE, IT	
	Stakeholder involvement in the monitoring and evaluation process is agreed and clearly described.	DE, ES, PL		IT
	The national/regional standards and processes for improving and assuring quality are relevant and proportionate to the needs of the sector.	DE, PL, UK	ES, IT	
	Systems are subject to self-evaluation, internal and external review, as appropriate.	DE, UK	ES, PL	IT
	Early warning systems are implemented.	UK(En,Sct,Wls)	DE, ES, PL, UK(NI)	IT
	Performance indicators are applied.	DE, PL, UK	IT	
	Relevant, regular and coherent data collection takes place, in order to measure success and identify areas for improvement.	ES, PL, UK(Wls, Sct,NI)	DE, IT. UK(En)	
	Appropriate data collection methodologies have been devised, e.g. questionnaires and indicators/metrics	DE, ES, PL, UK	IT	
Review	Procedures, mechanisms and instruments for undertaking reviews are defined at all levels.	DE, PL, UK(En,Sct,Wls)	ES, IT, UK(NI)	
	Processes are regularly reviewed and action plans for change devised. Systems are adjusted accordingly.	PL, UK	DE, ES, IT	
	Information on the outcomes of evaluation is made publicly available.	DE, ES, PL, UK	IT	

Source: EQAVET Secretariat survey 2018

Table 8 – Selected quality indicators in EQARF and use in the IVET sector in the case study countries

Indicator	Always used	Sometimes used
1. Relevance of quality assurance systems for VET providers: (a) share of VET providers applying internal quality assurance systems defined by law/at own initiative	DE, ES, UK, PL	IT
(b) share of accredited VET providers	DE, ES, IT, UK(En, Wls, NI)	PL, UK(Sct)
2. Investment in training of teachers and trainers: (a) share of teachers and trainers participating in further training	DE, ES, PL, UK(Eg,Wls,NI)	IT, UK(Sct)
(b) amount of funds invested	ES, IT, PL, UK(En,Wls,NI)	DE, UK(Sct)
3. Participation rate in VET programmes: Number of participants in VET programmes, according to the type of programme and the individual criteria	DE, ES, IT, PL, UK(En,Wls,NI)	UK(Sct)
4. Completion rate in VET programmes: Number of persons having successfully completed/abandoned VET programmes, according to the type of programme and the individual criteria	DE, ES, IT, PL, UK(En,Wls,NI)	UK(Sct)
5. Placement rate in VET programmes: (a) destination of VET learners at a designated point in time after completion of training, according to the type of programme and the individual criteria	DE, IT	ES, PL, UK
(b) share of employed learners at a designated point in time after completion of training, according to the type of programme and the individual criteria	DE, IT	ES, PL, UK
6. Utilisation of acquired skills at the workplace: (a) information on occupation obtained by individuals after completion of training, according to type of training and individual criteria	DE	ES, IT, PL, UK
(b) satisfaction rate of individuals and employers with acquired skills/competences	DE	ES, IT, PL, UK
7. Unemployment rate according to individual criteria	DE, IT, UK	ES, PL
8. Prevalence of vulnerable groups: (a) percentage of participants in VET classified as disadvantaged groups (in a defined region or catchment area) according to age and gender	DE, ES, UK(En,Wls,NI)	IT, PL, UK(Sct)
(b) success rate of disadvantaged groups according to age and gender	DE, ES, UK(En, Wls,NI)	IT, UK(Sct)
9. Mechanisms to identify training needs in the labour market:		

(a) information on mechanisms set up to identify changing demands at different levels	DE, ES, IT, UK(En,Wls,Sct)	UK(NI)
(b) evidence of their effectiveness	DE, ES, UK(Wls)	IT, PL, UK(En,Sct,NI)
10. Schemes used to promote better access to VET: (a) information on existing schemes at different levels	DE, ES, PL, UK(Wls,Sct)	IT, UK(En,NI)
(b) evidence of their effectiveness	UK(Wls,En)	De, ES, IT, UK(Sct,NI)

Source: EQAVET Secretariat survey 2018

From the perspective of EQAVET, the benefits of adopting a common European Quality Assurance Reference Framework can be summarised in three main outcomes. First, by establishing a common reference for quality standards, it increases institutional trust, transparency of qualifications and workers' mobility. Second, it increases the permeability and flexibility of paths between general education, higher education and VET and access to lifelong learning. Third, ensuring international recognition, it enhances the attractiveness of VET in a European dimension.

A 2018 EQAVET Secretariat survey shows that all countries in the EU-28, except for Belgium (French Community), have devised an approach to quality assurance in VET and that no system differs from the main characteristic of EQAVET. As regards the five case study countries, Germany, Spain and the United Kingdom have devised national approaches independently of EQAVET, but compatible with the framework. In Italy and Poland, instead, the national approach was devised utilizing the EQAVET framework. Differently from the other case study countries, in Poland EQAVET compatible quality assurance is reported to apply only to IVET (EQVET Secretariat 2018).

The results of the survey highlight that the "EQAVET Framework continues to be an inspiration and supporting tool for actions taken by national bodies in charge of quality assurance. In this sense, EQAVET is serving as a basis for and triggering reform and development of a national approach to a common framework of quality assurance" (EQAVET Secretariat 2018, p. 17). Furthermore, EQAVET provides a reference for comparing and assessing the measures taken concerning quality assurance since all the approaches are compatible with the framework.

Table 9 provides an overview of the quality assurance governance in the ESSA case study countries.

Table 9 – Quality Assurance governance in the case study countries

Country	Status
Germany[28]	• The quality assurance of VET in Germany is based on many standards that complement each other, therefore it is difficult to grasp the Quality Assurance (QA) system as a whole. • The main nationwide foundation is the German Vocational Training Act. The Länder form a legal basis for school education, including vocational schools and are therefore also responsible for QA in that area. Because of federalism, a federal ministry is not able to introduce unilaterally a national QA strategy based on EQAVET indicators. Policymakers prefer to aim at raising awareness and providing information on the advantages of QA in VET and encourage stakeholders of the Länder to adopt EQAVET indicators in their QA frameworks. • The Länder are independent in their choice of QA frameworks. Thus, although quality assurance in VET is high on the national policy agenda, no national strategy is foreseen regarding QA in VET. • On the employer side, the competent bodies such as the Chambers of Industry and Commerce (IHK) are responsible for monitoring company-based VET. • The Vocational Education and Training Act (*Berufsbildungsgesetz*, BBiG) addresses required standards for training facilities and trainers, training curricula as well as examinations. Regulations concerning training facilities and trainers are usually monitored by the local Chambers of Industry and Commerce. • At national level, the Main Board of the Federal Institute (BIBB *Hauptausschuss*) is the principal advisory body of the Federal Government concerning VET. The Vocational Education and Training Act (BBiG) states that the Main Board advises the Federal Government on all VET issues and contributes, for example, to questions regarding standard setting and designing training regulations. There are similar Länder Boards (*Landesausschuss*) at state level. They advise the Länder governments on VET policy, especially in questions concerning QA. • The Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in Federal Republic of Germany (KMK) issues framework curricula for vocational education at vocational schools which are harmonised with the Federal Government's training regulations. The KMK is an important actor for education policy in Germany, as it provides a crucial platform for increasing uniformity and comparability between the federal states.

[28] https://www.eqavet.eu/Eqavet2017/media/Documents/2-DE_final_may-2016_updating-info-on-the-EQAVET-website.pdf

	• At ground level, the competent bodies are important actors in regard to QA issues for company-based VET. They mainly consist of 79 Chambers of Industry and Commerce and 53 Chambers of Crafts and Trades. At regional level, the competent bodies have their own Vocational Training Boards (*Berufsbildungsausschuss*) who support and advise them.
Italy[29]	• The issuing of the European Recommendation in 2009 pushed the process for a QA framework and contributed to a further development in the field at national level mainly thanks to the drafting and validation of the Italian National Plan for Quality Assurance for VET. Furthermore, the Recommendation has also acted as a stimulus for some Regions who have autonomously implemented some initiatives in the field of quality assurance. • The adoption of many of the indicators suggested by the European Recommendation is envisaged. The use of indicators and other statistical parameters represents a support for the more comprehensive evaluation, which remains entrusted to the various subjects involved. • For the IVET pathways falling within secondary education, a National Evaluation System was introduced in 2013. The main actors involved in this system are: INVALSI (Istituto nazionale per la valutazione del sistema di istruzione e formazione), Indire (Istituto nazionale di documentazione, innovazione e ricerca educativa) and a team of inspectors nominated by the Ministry of Education. The school evaluation process is based on the implementation of periodic and systematic surveys. • As for IVET courses managed by the Regions, the most relevant quality assurance tool is the accreditation of VET providers. It implies that Regions and Autonomous Provinces set standards relating to both services and expected results. Those standards refer to a common framework agreed at national level by all Regions and by the State. • A set of monitoring and evaluation tools are used by the Regions, some of them linked to a national monitoring system focusing on specific paths within IVET. Almost all Regions have issued their own qualifications register, as a reference tool for VET provision and the certification of acquired skills. • The Ministry of Education is the competent body defining strategies, policies, framework and learning and teaching programmes and ensuring staff recruitment and management of training activities. Here, the Ministry of Education is supported by two technical agencies and research institutes such as INDIRE and INVALSI.

[29] https://www.eqavet.eu/Eqavet2017/media/Documents/2-IT-final_template-for-updating-info-on-the-EQAVET-website.pdf

Spain[30]	• The Royal Decree 1147/2011, from the Ministry of Education, Culture and Sport establishes the National Quality Assurance Framework for VET. Taking into consideration that the final purpose of the European recommendation is to support Member States to promote and monitor continuous improvement of their VET systems, quality assurance systems in Spain are in line with EQAVET regarding the quality cycle, descriptors and indicators. • The Ministry of Education, Culture and Sport, and the Education Departments of the Autonomous Communities are in charge of quality assurance and the certification processes. The National Institute for Evaluation of Education (INEE) carries out the general evaluation of the education system. This general evaluation is based on the National System of Education Indicators, which has three main categories: schooling and educational environment, educational funding and educational results. The INEE publishes an annual report on the state of the education system based on those indicators. • Autonomous Communities have their own evaluation body responsible for the evaluation of the education system in its territory and collaborate with the National Institute for Evaluation of Education.
Poland[31]	• The National Centre for Supporting Vocational and Continuing Education (KOWEZiU) is a central, public, national-level institution, subject to the Ministry of National Education. It provides professional development services for teachers and support in implementing actions and initiatives related to VET. The Quality Assurance National Reference Point was established in KOWEZiU in September 2012. • According to the Act on the Education System, pedagogical supervision is the guarantee for quality in education. It is performed by education superintendents, who observe, report and give advice on how to improve the education process (vocational and general) up to the post-secondary level. • External pedagogical supervision is conducted by the Regional Education Authorities overseen by the Minister of Education. Pedagogical supervision covers four aspects: evaluation, an audit of legal compliance, monitoring and support. The Head of the Regional Education Authority prepares an annual report on the results of the educational supervision conducted and presents it to the Minister for Education. • The regulation places on the school/centre headmaster the obligation to conduct internal evaluation and use its results to improve its quality. The internal evaluation helps in gathering information on the school/centre's performance, the quality of its work and the effectiveness of its actions. Internal evaluation is used to diagnose quality deficits and plan further developments aiming at improving quality.

[30] https://www.eqavet.eu/Eqavet2017/media/Documents/2-ES_final_Template-for-updating-info-on-the-EQAVET-website.pdf
[31] https://www.eqavet.eu/what-we-do/implementing-the-framework/poland

	• Quality standards for vocational education have been developed. The main aim of them is to guide and support school headmasters and teachers in developing internal quality assurance systems and preparing internal evaluations. The quality standards for VET provide a comprehensive document covering all aspects of training presented in 10 thematic areas. The standards are a national approach to implementing in Poland the EQAVET initiative. It is expected that the standards, despite voluntary basis for their use, will contribute to improving the quality of education in both IVET and CVET schools and centres. • For all public and private institutions providing continuing education a mechanism for accreditation has been created in January 2004. It is a voluntary submission to the procedure of quality confirmation. The accreditation is made by the regional superintendents of schools. It is based on the analysis carried out by the team of experts who investigate school's functioning. The information on accredited units is entered in the register kept by the superintendent, which is available to the public.
United Kingdom[32] **(Scotland)[33]**	• In Scotland the national reference point is SQA Accreditation., which is part of the Scottish Qualifications Authority (SQA). SQA Accreditation quality assures qualifications offered in Scotland by approving awarding bodies and accrediting their qualifications. It does this by regulating awarding bodies and their qualifications against published regulatory requirements. • Awarding bodies are therefore required to seek accreditation if they wish their qualification to be included in the framework. • SQA Accreditation operates using Regulatory Principles and Regulatory Directives. EQAVET was considered when these were developed • SQA Accreditation continues to liaise with Education Scotland and to provide advice and guidance on the use of and interpretation of the EQAVET indicators • In Scotland, the National Quality Framework has been developed by Education Scotland and covers the learning and teaching environment in schools and further education colleges. There are slight differences in the framework according to the sector under consideration. • The Scottish Qualifications Authority is the main awarding body which awards qualifications in schools and further education colleges and has its own quality assurance arrangements for these qualifications. Other awarding bodies also operate in this area with similar quality assurance arrangements. • Awarding bodies will regularly review their quality assurance arrangements particularly in relation to the qualification content

[32] No detailed information is available on the EQAVET website on England and Northern Ireland
[33]www.eqavet.eu/Eqavet2017/media/Documents/2-UK_Scotland_final_-Template-for-updated-info-on-the-EQAVET-website.pdf

(Wales)[34]	• A quality assurance reference point was set up in Wales in 2009; this includes initial vocational education and training (IVET), continuing vocational education and training (CVET)/adult learning and non-formal learning • The quality and effectiveness framework (QEF), introduced in 2009, aimed to improve the quality of post-16 education in Wales. This framework, developed in cooperation with Estyn (the Inspectorate for Education and Training in Wales), provides a set of key performance indicators for post-16 providers to use in self-assessment, as well as being the basis for inspection. • A new Welsh Government-sponsored body Qualifications Wales was established in 2015 to act as an independent regulator of the Welsh regulated qualifications system. Only qualifications that are approved or designated by Qualifications Wales will be eligible for funding by a Local Authority or by Welsh Government.

3.5 Validation of non-formal and informal learning

The Council Recommendation of 2012 on the validation of non-formal and informal learning[35] had suggested that the Member States have in place by 2018 (in accordance with national specificities and where they deem appropriate) arrangements for the validation of non-formal and informal learning to offer individuals the opportunity to demonstrate and make visible (and certifiable) what they have learnt outside formal education and training. Such arrangements will enable individuals to have their knowledge, skills and competencies acquired through non-formal and informal learning validated, and obtain a full qualification, or part of a qualification, based on validated non-formal and informal learning experiences. Specifically, the Recommendation defines non-formal learning as learning which takes place through planned activities (in terms of objectives, time etc.) where some form of learning support is present (e.g. student-teacher relationships). Informal learning, on the other hand, is defined as learning resulting from daily activities related to work, family or leisure and is not organised or structured in terms of objectives, time or learning support and may be unintentional from the learner's perspective.

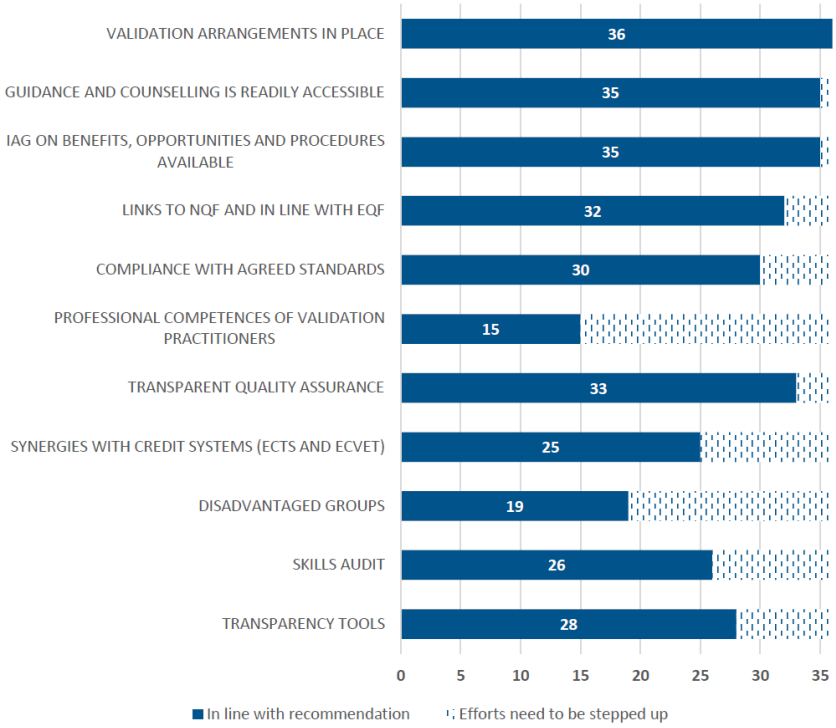
The overall validation process is devised as made of four stages, namely identification, documentation, assessment and certification. In the certification stage, the results of the assessment of an individual's learning outcomes acquired through non-formal and informal learning are certified in the form of a qualification, or credits leading to a qualification (or in another form, as appropriate).

The Recommendation also suggests a list of principles to apply as appropriate, including that the validation arrangements are linked to National Qualifications Frameworks and are in line with the EQF, and that validation is supported by appropriate guidance and counselling and is readily accessible.

[34] https://www.eqavet.eu/Eqavet2017/media/Newsletter/Building-a-Better-Wales-Lessons-from-Europe.pdf
[35] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012H1222(01)&from=EN

Cedefop (2019b) offers a snapshot of the state of implementation of validation arrangements in 36 countries included in the European inventory. A summary of the progress made towards the 11 principles outlined in the Recommendation is represented in Figure 1 below.

Figure 1 – Progress made towards the 11 validation principles



Source: Cedefop 2019b

For what concerns the ESSA case study countries, information on the state of play of validation arrangements are summarised in the tables below. Table 10 shows the sectors in which validation can take place, distinguishing between general education (GE), initial vocational training (IVET), continuing vocational training (CVET), higher education (HA) and adult education (AE). Table 11 shows the possible outcomes of the validation process, ranging from the award of a complete qualification to the award of an individual module or exemptions from part of the course.

Table 10 – Validation arrangements in education and training (Initial VET, Continuing VET, Higher Education and Adult Education) by country

Country	Validation arrangements
Germany	All sectors
Italy	IVET, CVET, HE, AE
Poland	GE, IVET, CVET, HE
Spain	All sectors
UK (England, Northern Ireland)	IVET, HE, AE
UK (Scotland)	IVET, CVET, HE, AE
UK (Wales)	IVET, CVET, HE, AE

Source: Cedefop 2019b

Table 11 – Possible outcome of the validation process

Outcome of validation	Country
Award of full formal qualification	DE, ES, IT, PL, UK (En,NI)
Award of part of a formal qualification	DE, ES, IT, PL, UK
Award of other non-formal qualification/certificate	DE, ES, PL, UK (Sct,Wls)
Award of credit points	DE, ES, IT, PL, UK
Award of modules	ES, IT, PL, UK
Exemptions from part of course	PL, UK

Source: Cedefop 2019b

As a concluding remark, it has to be noted that the validation arrangements might not refer to a system-level framework, but rather to arrangements at the Regional/local level. The study on the EU VET instruments conducted by the EC (2019), for instance, distinguishes three groups of countries: (a) Mechanisms to coordinate validation at the national level in place; (b) Mechanisms to coordinate validation in conjunction with regional/sectoral arrangements; (c) No coordinating mechanisms at the national level. In such framework, Germany is reported to have no coordinating mechanism at the national level; Italy is reported to have a mechanism in place at the national level, however, it has to be noted that Italian regions have considerable autonomy for the deployment of solutions (Cedefop 2019b); Poland is reported having a national system; Spain is reported to have a national mechanism that operates in conjunction with regional/sectoral arrangements; finally, the UK does not have an overarching mechanism and validation regulation is devolved to local authorities.

3.6 European classification of Skills, Competences, Qualifications and Occupations (ESCO)

A demo version of ESCO was launched in October 2013, while the first version was released in July 2017[36]. The database is updated by DG Employment, Social Affairs and Inclusion with the support of Cedefop and stakeholders. ESCO "works as a dictionary, describing, identifying and classifying professional occupations, skills, and qualifications relevant to the EU labour market and education and training"[37]. As mentioned on the official ESCO portal, the main aim of the system is to support workers' mobility across the EU and a more integrated labour market by offering a common understanding of skills, occupations and qualifications. The ESCO database helps users to understand:

a) the knowledge and skills related with a specific occupation
b) the knowledge, skills and competencies related with a specific qualification
c) the qualifications related with a specific occupation

The Commission has developed ESCO with the following aims[38]:

1. to improve the communication between the education and training sector and the EU labour market;
2. to support geographical and occupational mobility;
3. to make data more transparent and easily available for use by various stakeholders;
4. to facilitate the exchange of data between employers, education providers and job seekers;
5. to support evidence-based policy making by enhancing the collection, comparison and dissemination of data in skills intelligence and statistical tools, and enabling better analysis of skills supply and demand.

The ESCO system is currently based on two pillars, skills/competencies and occupations, that are interrelated with each other. The occupations pillar currently entails 2.942 occupations, linked with the ISCO-08 classification. The skills pillar contains 13.485 skills linked to the occupations

ESCO occupations commonly entail:

- a description, which provides a short explanation of the meaning of the occupation and how it should be understood:
- alternative labels for the same occupation
- regulatory aspects
- hierarchical location within ISCO-08
- Essential skills, competencies and knowledge[39]
- Optional skills, competencies and knowledge.

Within ESCO, skills, knowledge and competencies are defined as "essential" or "optional", depending on their being common for the occupation or not.

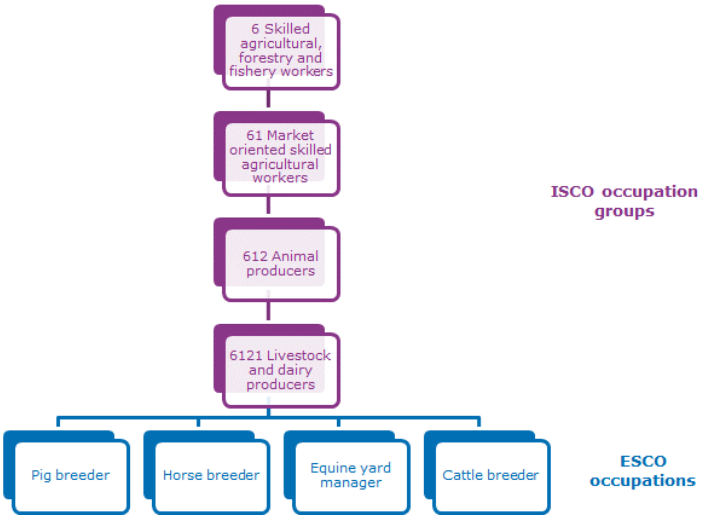
[36]https://ec.europa.eu/esco/portal/escopedia/European_Skills_44__Competences_44__Qualifications_and_Occupations__40_ESCO_41_
[37] https://ec.europa.eu/esco/portal/howtouse/21da6a9a-02d1-4533-8057-dea0a824a17a
[38] DG for Employment, Social Affairs and Inclusion (2019), ESCO Handbook. Retrieved from https://ec.europa.eu/esco/portal/documents
[39] Within ESCO, skills, knowledge and competences are defined as "essential" or "optional", depending on their being common for the occupation or not.

Table 12 – Occupations, skills and qualifications in the ESCO view

Occupation	Skills and Competencies	Qualifications
An occupation is a grouping of jobs involving similar tasks and which require a similar skills set. Occupations should not be confused with jobs or job titles. While a job is bound to a specific work context and executed by one person, occupations group jobs by common characteristics[40].	Skill means the ability to apply knowledge and use know-how to complete tasks and solve problems. They can be described as cognitive or practical. The term skill refers typically to the use of methods or instruments in a particular setting and in relation to defined tasks. The term competence is broader and refers typically to the ability of a person to use and apply knowledge and skills in an independent and self-directed way[41].	A qualification is the formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards[42].

The ESCO occupations pillar is made of the ESCO occupations profiles and the related ISCO-08 hierarchies (see Fig. 2). ISCO-08 provides the top four levels of the hierarchy (Major group, sub-major groups, minor groups and unit groups), while ESCO provides the fifth and lower level.

Figure 2 – ESCO/ ISCO-08 relationship



Source: ESCO Handbook (2019)

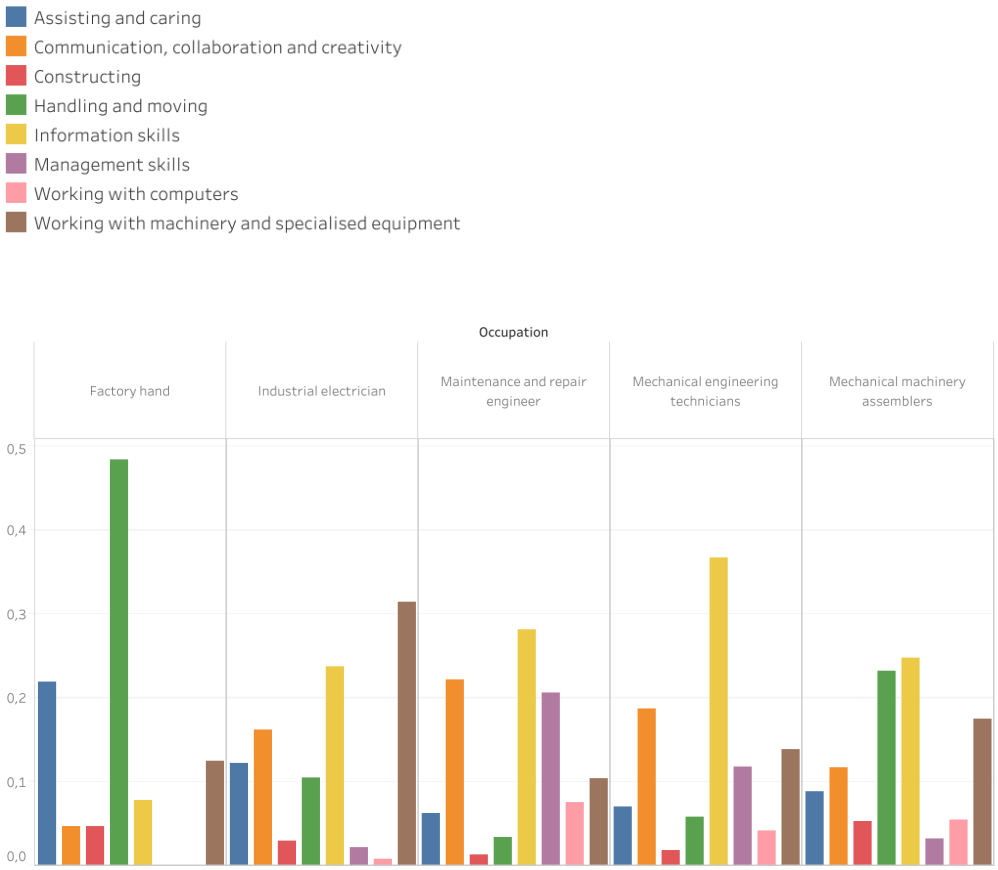
The most relevant feature of ESCO is that it is strictly interrelated with the most important cross-European frameworks such as EQF, ISCO-08, ISCED-F 2013 and the Digital Competences Framework (DigComp). The ISCO-08 complementarity is crucial as ISCO is already a

[40] https://ec.europa.eu/esco/portal/escopedia/Occupation
[41] https://ec.europa.eu/esco/portal/escopedia/Skill
[42] https://ec.europa.eu/esco/portal/escopedia/Qualification

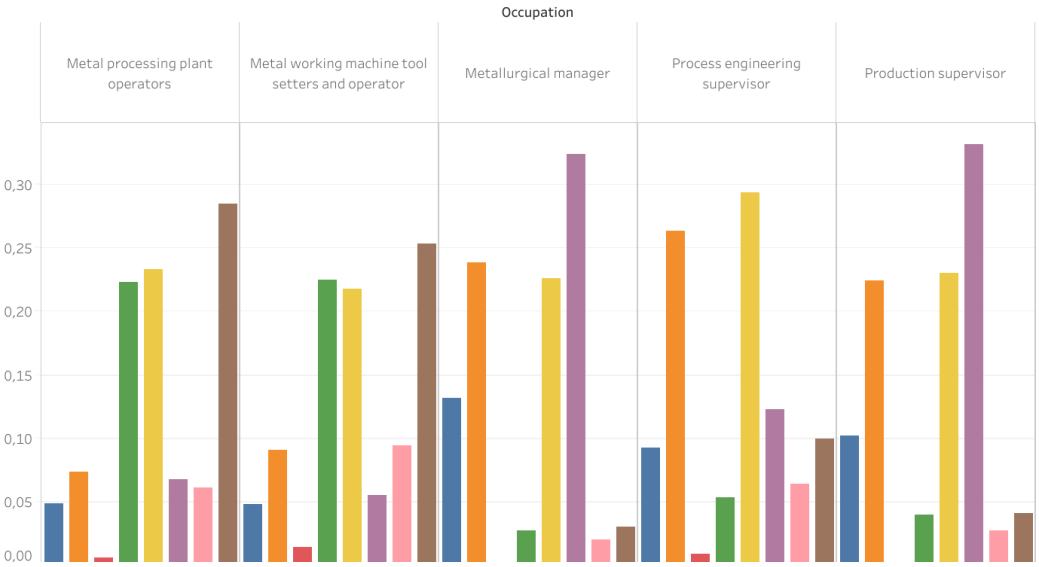
well-established reference system in most of the EU countries, making it easier to map the occupations to ESCO as well. Furthermore, as ISCO-08 coding is used for statistical analysis, it allows ESCO to be used also as a refined tool for EU labour market statistical surveys since the terminology used in ESCO is more detailed than ISCO-08 and closer to the labour market language. Linking a qualification included in the qualification pillar with an EQF level and mapping them to ISCED-F 2013[43] enhances the transparency and comparability of qualifications across different countries. Finally, the DigComp framework works as a shared vocabulary of digital competencies at the European level. DigComp is integrated into the set of digital transversal skills.

Figure 3 below represents a selection of ESSA-relevant job profiles based on the skills-occupations matrix tables recently compiled by ESCO to connect ISCO-08 occupational groups to ESCO skills. The figure below is based on a correlation of ISCO-08 unit groups (4 digits) and ESCO skills at the first hierarchical level and provide a snapshot of the skills composition of 10 steel industry occupations selected within ESSA. It should be noted that the label "assisting and caring" used within ESCO (which might sound inappropriate in relation to steel industry occupations) entails in the ESCO definition also providing service and support to people, and ensuring compliance to rules, standards, guidelines or laws.

Figure 3 – Skills composition at ESCO level 1 of 10 selected steel job profiles (within ISCO-08 unit groups)



[43] ISCED-F is part of the International Standard Classification of Education (ISCED) and it has been designed to to describe and categorise fields of education and training at the secondary, post-secondary and tertiary levels of formal education.



Source: ESCO data, own elaboration

3.7 International Standard Classification of Occupations (ISCO-08)[44]

As explained above, the ESCO database draws on ISCO-08 hierarchical structure. ISCO is a four-level classification of occupations which are sorted into 10 "major groups", 43 "sub-major groups", 130 "minor groups" and 436 "unit groups". The occupations are sorted based on the skill level and skill specialization required. Skill level is intended as a function of the complexity and range of tasks to be performed, while skill specialization is considered in terms of the field of knowledge required, the materials, tools and machinery used, the type of goods and services produced. Within ISCO, the dimension of skill level is applied mainly at the level of major group, while the other three levels are sorted mainly on the basis of skill specialization.

The first skill level is associated with performing simple routine tasks that require the use of simple tools. Though some basic literacy and numeracy may be required, this is not considered to be a major part of the job.

Skill level two refers to occupations that imply the use of machinery and electronic equipment, and the ability to read an understand information such as safety instructions, make written records of completed tasks and perform simple calculations. The occupations associated with this level usually require a good level of literacy and numeracy and good social skills.

Occupations at skills level 3 require the possession of technical and procedural knowledge in a specialised field and imply the capacity to perform complex tasks (both technical and/or cognitive). Occupations at this level imply also the possession of a high level of literacy and numeracy and good social skills.

The fourth skills level implies the possession of high problem-solving and decision-making skills, creativity, as well as a consistent body of theoretical knowledge in a specialised field, along with a high level of literacy, numeracy and communication abilities.

[44] This paragraph is based on ILO (2012), *International Standard Classification of Occupations. Structure, group definitions and correspondence tables*, International Labour Office, Geneve.

The ISCO classification provides a framework for the production of comparable (statistical) data across different countries. Each group is univocally identified by a title, a numerical code, and a description that explains the essential tasks and duties of the grouped occupations.

ISCO is intended to work as a model and a meta-framework, not to replace any national statistical classification system.

The development of the ISCO classification has a long history, starting from the first attempt made by the International Labour Organization (ILO) through the "International Classification of Occupations for Migrations and Employment Placement" published in 1952. Since then, different versions of ISCO have been developed and published, in 1958 (ISCO-58), 1968 (ISCO-68), 1987 (ISCO-88) and, finally, ISCO-08 as the last version.

The 10 major groups identified are linked with a skill level, as follows (Table 13):

Table 13 – Major groups in ISCO-08 and related skill level

Major Group	Skill level
0. Armed forces occupations	1, 2, 4
1. Managers	3, 4
2. Professionals	4
3. Technicians and associate professionals	3
4. Clerical support workers	2
5. Services and sales workers	2
6. Skilled agricultural, forestry and fishery workers	2
7. Craft and related trades workers	2
8. Plant and machine operators, and assemblers	2
9. Elementary occupations	1

Source: ILO (2012), International Standard Classification of Occupations. Structure, group definitions and correspondence tables

Each of the 436 unit groups in ISCO-08 is made up of occupations with a high degree of similarity from the point of view of skills level and skills specialization.

The definition provided for each group should be precise enough to define the essential characteristics of the specific occupational group they refer to, but wide enough to make it possible to associate any given occupation in any country to one of them.

3.8 International Standard Classification of Education (ISCED)

The International Standard Classification of Education has been developed and is maintained by UNESCO's Institute for Statistics. The classification moves from the premise that national education systems display many differences in terms of routes and curricular contents and this makes it difficult to benchmark performances and compare outputs. On this basis, the ISCED framework was firstly developed in the 1970s, and updated in 1997 and 2011, to provide a common framework for cross-national classification and statistical analysis of Education systems (UNESCO, 2012). The adoption of the ISCED framework can support the transformation of national education statistics into aggregate data that can be compared and analysed from an international perspective.

From the ESSA perspective, the combination of ISCED with the international frameworks described in the previous paragraphs can help to map the steel-related qualifications in the partner countries and to make clearer their vocational and educational level and their link with a specific job.

ISCED classifies education programmes using two main variables: levels of education and fields of education (Ibidem). The basic units of the classification are the national education programmes and the related educational qualifications. ISCED defines an education programme as "a coherent set or sequence of educational activities or communication designed and organized to achieve pre-determined learning objectives or accomplish a specific set of educational tasks over a sustained period" (Ibidem, p. 7). A qualification is consequently intended as the official confirmation (in the form of a certificate) of the successful completion of an education programme. ISCED maps the links between education programmes and qualifications.

The national and regional qualification frameworks can be effectively combined with ISCED to make transparent the competencies, skills and knowledge associated with a specific qualification.

The levels on which ISCED is structured reflect "the degree of complexity and specialization of the content of an education programme, from foundational to complex" (Ibidem, p. 13), from 0 to 8. The levels are associated with the duration of education programmes and achievements, as described below (Ibidem):

- Level 0. No duration criteria [Early childhood education]
- Level 1. From 4 years to 7 years (most commonly 6) [Primary education]
- Level 2. From 2 years to 5 years (most commonly 3) [Lower secondary education]
- Level 3. From 2 years to 5 years (most commonly 3) [Upper secondary education]
- Level 4. From 6 months to 3 years [Post-secondary, non-tertiary education]
- Level 5. From 2 years to 3 years [Short-cycle tertiary education]
- Level 6. From 3 years to 4 years [Bachelor's or equivalent level]
- Level 7. From 1 year to 4 years [Master's or equivalent level]
- Level 8. Minimum of 3 years [Doctoral or equivalent level]

Connections can also be established between ISCED levels and ISCO-08 skill levels (Table 14).

Table 14 – Relationship between ISCO-08 skill levels and ISCED-97

ISCO-08 skill level	ISCED-97
4	6. Second stage of tertiary education
	5a. First stage of tertiary education
3	5b. First stage of tertiary education
2	4. Post-secondary, non tertiary education
	3. Upper secondary level of education
	2. Lower secondary level of education
1	1. Primary level of education

Source: Source: ILO (2012), International Standard Classification of Occupations. Structure, group definitions and correspondence tables

The revision of ISCED made in 2011 led to the decision to provide a separate (but connected) classification for the fields of education, that still remains part of the same family of classifications, which has taken the name of ISCED Fields of Education and Training (ISCED-F) (UNESCO 2014). ISCED-F refers to the same units of classification of ISCED 2011, that is education programmes. ISCED-F classifies education programmes and qualifications by field of study, where a field is intended as a "broad domain, branch or area of content covered by an education programme or qualification" (Ibidem, p. 5).

ISCED-F has been designed to describe and classify fields of education and training at secondary, post-secondary and tertiary level as defined in ISCO 2011, but it can be used also to classify programmes and qualifications at other levels. The classification is structured in three hierarchical levels, from the first level (broad), which encompasses 11 fields, to the second (narrow), which includes 29 fields, to the third (detailed) made of 80 fields. The third level is intended mainly for use at the tertiary level of education and vocational education and training programmes and qualifications at secondary and post-secondary, non-tertiary levels.

The grouping of programmes and qualifications into broad, narrow and detailed fields is based on the similarity of the subject matter. Two programmes or qualifications are recognised as belonging to the same field where "the main subjects studied are the same or are sufficiently similar" (Ibidem, p. 7). The degree of similarity of the subject matter is established through the following criteria: theoretical knowledge content, purpose of learning, objects of interest, methods and techniques, tools and equipment (Ibidem).

3.9 Erasmus+ Programme[45]

The Erasmus+ Programme covers the fields of education, training, youth and sport, and it was established to tackle the socio-economic changes and challenges that Europe will be facing until

[45] This paragraph is based on the "Erasmus+ Programme Guide 2019", retrieved from https://ec.europa.eu/programmes/erasmus-plus/resources/documents/erasmus-programme-guide-2019_en

the end of the decade, such as youth unemployment, and to support the EU policies in consistence with the EU2020 strategy.

The Programme is based on the idea that effective education and training systems and youth policies will provide people with those skills that are actually required by the labour market and will, at the same time, enhance the capacity of people to play an active role within society. In summary:

> "The Erasmus+ Programme is designed to support Programme Countries' efforts to efficiently use the potential of Europe's talent and social assets in a lifelong learning perspective, linking support to formal, non-formal and informal learning throughout the education, training and youth fields. The Programme also enhances the opportunities for cooperation and mobility with Partner Countries, notably in the fields of higher education and youth" (Erasmus+ Programme Guide 2019, p. 5).

One of the Erasmus+ objectives is explicitly that of supporting the establishment of a framework for European cooperation in education and training, including the corresponding benchmarks. Indeed, the recognition and validation of skills and qualifications is highlighted as one of the features of the programme. Erasmus+ supports tools such as Europass, EQF, ECVET, EQAVET (the European Quality Assurance Reference Framework), the purpose of which is to ensure that skills and qualifications are better understood across the EU countries and, consequently, easily recognisable.

The Programme is structured into three key actions and 2 extra sections, as follows:

- Key action 1, "mobility of individuals".
- Key action 2, "cooperation for innovation and the exchange of good practices".
- Key action 3, "support for policy reform"
- Jean Monnet activities[46]
- Sport

In the perspective of the ESSA project, the most relevant actions are those that fall under the key action 1 and 2. In particular:

a) "mobility of learners and staff" (key action 1) provides opportunities for students and trainees (as well as for professors, teachers, trainers, etc.) to undertake a learning and/or professional experience in another country.
b) "transnational strategic partnerships" (key action 2) help to develop initiatives addressing one or more fields of education, training and youth and promote innovation, exchange of experience and know-how between different types of organisations;
c) "knowledge alliances" (key action 2) between higher education institutions and enterprises aim to foster innovation, entrepreneurship, creativity, employability and knowledge exchange;
d) "sector skills alliances" (key action 2), under which ESSA falls, support the design and delivery of joint vocational training curricula and programmes drawing on evidence of trends in a specific economic sector and skills needed in order to perform in one or more professional fields;

The actions linked with education and training share the following explicit aims:

[46] These aim to promote excellence in teaching and research in the field of European Union studies (comprising the study of Europe with particular emphasis on the European integration and the role of the EU in a globalised world) and to foster the dialogue between the academic world and policy-makers, in particular with the aim of enhancing governance of EU policies.

- improve the level of key competences and skills, with particular regard to their relevance for the labour market, in particular through increased opportunities for learning mobility and through strengthened cooperation between the world of education and training and the world of work;
- foster quality improvements, innovation excellence and internationalisation at the level of education and training institutions;
- promote the emergence and raise awareness of a European lifelong learning area;
- enhance the international dimension of education and training, in particular through co-operation between Programme and Partner-Country institutions in the field of VET and in higher education.

3.10 European Digital Competence Framework (DigComp)

The European Digital Competence Framework is the outcome of a project started in 2010 by the Joint Research Centre on behalf of the Directorate General for Education and Culture to identify the key digital skills and competencies[47] needed to be "digitally proficient" in the contemporary society.

The Recommendation of the European Parliament and of the Council of December 2006 on key competencies for lifelong learning[48] established that digital competence[49], is one of the recognised 8 key competencies, together with communication in the mother tongue, communication in foreign languages, mathematical competence and basic competences in science and technology, learning to learn, social and civic competences, sense of initiative and entrepreneurship, cultural awareness and expression.

DigComp identifies 5 strategic areas which are in turn broken down into related subdimensions (see Table 15).

[47] https://ec.europa.eu/jrc/en/digcomp/project-background
[48] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32006H0962
[49] Here digital competence is defined as "the confident and critical use of Information Society Technology (IST) for work, leisure and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet" (p. 15).

Table 15 – DigComp areas and sub-dimensions

Area	Sub-dimensions
1. Information and data literacy	1.1 Browsing, searching and filtering data, information and digital content
	1.2 Evaluating data, information and digital content
	1.3 Managing data, information and digital content
2. Communication and collaboration	2.1 Interacting through digital technologies
	2.2 Sharing through digital technologies
	2.3 Engaging in citizenship through digital technologies
	2.4 Collaborating through digital technologies
	2.5 Netiquette
	2.6 Managing digital identity
3. Digital content creation	3.1 Developing digital content
	3.2 Integrating and re-elaborating digital content
	3.3 Copyright and licences
	3.4 Programming
4. Safety	4.1 Protecting devices
	4.2 Protecting personal data and privacy
	4.3 Protecting health and well-being
	4.4 Protecting the environment
5. Problem solving	5.1 Solving technical problems
	5.2 Identifying needs and technological responses
	5.3 Creatively using digital technologies
	5.4 Identifying digital competence gaps

The DigComp framework can help education and training agencies to set training goals and identify training opportunities and help policymakers to monitor citizens' digital skills and support the modernisation of curricula.

The framework is based on four proficiency levels, namely foundation, intermediate, advanced and highly specialised. The four levels are split into two each, for a total number of eight, that can help to trace a more detailed description of progression criteria, where each of the eight levels represents a further progression of the individual in three different domains, acquisition of knowledge of the competence, complexity of the task to handle, autonomy in completing the task (Joint Research Centre, 2018).

From the perspective of the ESSA project, the DigComp framework is useful in providing a general and shared understanding of what digital competencies are and entail, offering also an up-to-date vocabulary specific for the sector. It allows for the standardisation of initiatives in education and training at the local or national level in reference to a common EU framework. In such a way, DigComp provides guidance and structure to all those initiatives that deal with

teaching digital competencies and defines an EU benchmark for the sector. DigComp is integrated into the ESCO skills pillar and is used in ESSA as a reference for the identification of digital skills gaps.

Table 16 – DigComp use in the ESSA case study countries

Country	Initiatives
Germany	• The new strategy called "*Bildung in der digitalen Welt*" (Education in the digital world) is approved by the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany. The model is based on DigComp and two other relevant frameworks.
Italy	• Emilia Romagna uses DigComp to re-design courses/materials in Pane e internet, an e-inclusion initiative. • The Italian Digital Agenda will translate and implement DigComp as part of its strategy.
Poland	• Certification and training for certification purposes based on DigComp is provided by ECCC Foundation and ECDL in Poland. • The Ministry of Digital Affairs published a catalogue of digital competence frameworks for Digital Poland 2014-2020 referring to DigComp.
Spain	• The Ministry of Education created the Common Framework for Teacher Digital Competence based on DigComp. The use is agreed between the State and Regional governments. It is used as a base for planning teacher Professional Development programmes. • Extremadura implements the Spanish DigComp for Teachers Digital Competence Portfolio. • The Ikanos project by the Basque Government uses the DigComp framework to deploy the Digital Agenda. This includes a free online testing tool that is based on DigComp's five areas of digital competence. • The portal "Andalucia digital" by the Regional Government of Andalusia offers a free of charge online self-assessment tool based on DigComp's five areas of digital competence. After the self-assessment, job seekers can access training material in different areas.
United Kingdom	• The Basic Digital Skills framework aligns with DigComp (originally created by GO ON UK).

Source: https://ec.europa.eu/jrc/en/digcomp/implementation

3.11 European e-Competence Framework[50]

The European e-Competence Framework (e-CF) is part of the broader European Union's strategy "e-Skills for the 21st Century", outlined by the European Commission in the Communication of September 2007[51]. In this document, the Commission expresses the cruciality of ICT skills to the European economy for developing productivity and knowledge-intensive products and services. The Communication draws on the work conducted since 2003 by the European e-Skills Forum and in the perspective of establishing a long-term e-skills Agenda. The challenges identified by the commission were mainly the lack of a long-term policy at European level and the persistence of a fragmented (national) approach to the issue. Another issue referred to was the mismatch between demand and supply of specific e-skills.

On this premises, the Commission recommended the development of a European e-Competence Framework "based on the requirements of stakeholders and the results of preparatory work within the European Committee for Standardisation in line with the proposal for a European Qualifications Framework" (Ibidem, p. 8).

The process of developing the framework was indeed initiated in 2006 through the collaborations of several European stakeholders and organizations, with the support of the European Commission and the European Committee for Standardization (CEN). A first version (1.0) was published in 2008 as an outcome of two years of collaborative work from the involved organizations. An updated version (2.0) came out in 2010 with an already definitive structure based on four analytical dimensions. The last version (3.0) was released in 2014 and provides a reference for 40 competencies as they are required and applied in Information and Communication Technology (ICT) workplaces. As most of the described EU frameworks, the European e-Competences Framework, was designed to support mutual understanding and transparency of competencies in ICT.

E-CF is structured as follows (table 10):

Table 17 – European e-Competence Framework structure

Dimension 1	Dimension 2	Dimenson 3	Dimension 4
Competences areas	References for each area	Proficiency levels	Knowledge and skills
5 areas: plan; build, run; enable; manage	Identifies a set of reference competences for each area: 40 e-competences identified in total	Provide proficiency levels from 1 to 5, linked with EQF 3 to 8	Provides samples of knowledge and skills related to the competences listed under dimension 2.

The areas and competences under dimension 1 and 2 are presented from an organizational perspective, while dimension 3 is intended to bridge these with individual competencies, linking them to EQF. Competence in this context is defined as "a demonstrated ability to apply knowledge, skills and attitudes to achieving observable results" (CEN 2014b, p. 11).

[50] This paragraph is mainly based on CEN (2014a), European e-Competences Framework 3.0.
[51] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52007DC0496.

The information provided in the fourth dimension are useful in linking e-competences with learning outcomes as basic components of formal qualifications and can work as "a bridge between organisation competences and vocational training and qualifications" (Ibidem, p. 18).

The European e-Skills Forum[52], has identified three main areas within the general domain of e-skills (*Ibidem*):

a) ICT pratctitioner skills
b) e-business skills
c) ICT user skills

The e-CF focuses strictly on "competences which are needed and applied in the ICT business related workplace including both ICT practitioners and e-business managers" (Ibidem, p. 12), in so excluding ICT user skills from its scope.

Figure 4 – European e-Competences Framework overview

Dimension 1 5 e-CF areas (A – E)	**Dimension 2** 40 e-Competences identified	**Dimension 3** e-Competence proficiency levels e-1 to e-5, related to EQF levels 3–8				
		e-1	e-2	e-3	e-4	e-5
A. PLAN	A.1. IS and Business Strategy Alignment				■	■
	A.2. Service Level Management			■	■	
	A.3. Business Plan Development			■	■	■
	A.4. Product/Service Planning		■	■	■	
	A.5. Architecture Design			■	■	■
	A.6. Application Design	■	■	■		
	A.7. Technology Trend Monitoring				■	■
	A.8. Sustainable Development			■	■	
	A.9. Innovating				■	■
B. BUILD	B.1. Application Development	■	■	■		
	B.2. Component Integration		■	■	■	
	B.3. Testing	■	■	■	■	
	B.4. Solution Deployment	■	■	■		
	B.5. Documentation Production	■	■	■		
	B.6. Systems Engineering			■	■	
C. RUN	C.1. User Support	■	■	■		
	C.2. Change Support		■	■		
	C.3. Service Delivery	■	■	■		
	C.4. Problem Management		■	■	■	
D. ENABLE	D.1. Information Security Strategy Development				■	■
	D.2. ICT Quality Strategy Development				■	■
	D.3. Education and Training Provision		■	■		
	D.4. Purchasing		■	■	■	
	D.5. Sales Proposal Development		■	■		
	D.6. Channel Management			■	■	
	D.7. Sales Management			■	■	■
	D.8. Contract Management		■	■	■	
	D.9. Personnel Development		■	■	■	
	D.10. Information and Knowledge Management			■	■	■
	D.11. Needs Identification			■	■	■
	D.12. Digital Marketing		■	■	■	
E. MANAGE	E.1. Forecast Development			■	■	
	E.2. Project and Portfolio Management		■	■	■	■
	E.3. Risk Management		■	■	■	
	E.4. Relationship Management			■	■	
	E.5. Process Improvement			■	■	
	E.6. ICT Quality Management		■	■	■	
	E.7. Business Change Management			■	■	■
	E.8. Information Security Management		■	■	■	
	E.9. IS Governance				■	■

Source: CEN 2014a

[52] The European e-Skills Forum was established by the European Commission in March 2003 to foster the dialogue between stakeholders and to catalyse actions helping to narrow the e-skills gap and to address e-skills mismatches.

The competencies listed (Figure 4) are then broken down into levels of proficiency and a set of possibly associated skills and knowledge, as in the following example regarding competence C.4, "problem management" (Figure 5).

Figure 5 – e-competence outline

Dimension 1 e-Comp. area	**C. RUN**				
Dimension 2 e-Competence: Title + generic description	**C.4. Problem Management** Identifies and resolves the root cause of incidents. Takes a proactive approach to avoidance or identification of root cause of ICT problems. Deploys a knowledge system based on recurrence of common errors. Resolves or escalates incidents. Optimises system or component performance.				
Dimension 3 e-Competence proficiency levels e-1 to e-5, related to EQF levels 3 to 8	**Level 1** –	**Level 2** Identifies and classifies incident types and service interruptions. Records incidents cataloguing them by symptom and resolution.	**Level 3** Exploits specialist knowledge and in-depth understanding of the ICT infrastructure and problem management process to identify failures and resolve with minimum outage. Makes sound decisions in emotionally charged environments on appropriate action required to minimise business impact. Rapidly identifies failing component, selects alternatives such as repair, replace or reconfigure.	**Level 4** Provides leadership and is accountable for the entire problem management process. Schedules and ensures well trained human resources, tools, and diagnostic equipment are available to meet emergency incidents. Has depth of expertise to anticipate critical component failure and make provision for recovery with minimum downtime. Constructs escalation processes to ensure that appropriate resources can be applied to each incident.	**Level 5** –
Dimension 4 Knowledge examples *Knows / aware of / familiar with*	K1 the organisation's overall ICT infrastructure and key components K2 the organisation's reporting procedures K3 the organisation's critical situation escalation procedures K4 the application and availability of diagnostic tools K5 the link between system infrastructure elements and impact of failure on related business processes.				
Skills examples *Is able to*	S1 monitor progress of issues throughout lifecycle and communicate effectively S2 identify potential critical component failures and take action to mitigate effects of failure S3 conduct risk management audits and act to minimise exposures S4 allocate appropriate resources to maintenance activities, balancing cost and risk S5 communicate at all levels to ensure appropriate resources are deployed internally or externally to minimise outages				

Source: CEN 2014a

Although competence and qualification are different entities and it is impossible to establish a perfect relationship between them (CEN 2014b), the e-CF development team has worked towards linking in an illustrative manner the proficiency levels expressed in e-CF to the learning outcomes of EQF, as shown in Table 18.

Table 18 - e-CF/EQF relationship

EQF level	Descriptors	e-CF level	Descriptors
8	Knowledge at the most advanced frontier, the most advanced and specialised skills and techniques to solve critical problems in research and/or innovation, demonstrating substantial authority, innovation, autonomy, scholarly or professional integrity.	5	Principal: Overall accountability and responsibility; recognised inside and outside the organisation for innovative solutions and for shaping the future using outstanding leading-edge thinking and knowledge.
7	Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking, critical awareness of knowledge issues in a field and at the interface between different fields, specialised problem-solving skills in research and/or innovation to develop new knowledge and procedures and to integrate knowledge from different fields, managing and transforming work or study contexts that are complex, unpredictable and require new strategic approaches, taking responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams.	4	Lead Professional/Senior Manager: Extensive scope of responsibilities deploying specialised integration capability in complex environments; full responsibility for strategic development of staff working in unfamiliar and unpredictable situations.
6	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles, advanced skills, demonstrating mastery and innovation in solving complex and unpredictable problems in a specialised field of work or study, management of complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts, for continuing personal and group professional development.	3	Senior Professional/Manager: Respected for innovative methods and use of initiative in specific technical or business areas; providing leadership and taking responsibility for team performances and development in unpredictable environments.
5	Comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge, expertise in a comprehensive range of cognitive and practical skills in developing creative solutions to abstract problems, management and supervision in contexts where there is unpredictable change, reviewing and developing performance of self and others.	2	Professional: Operates with capability and independence in specified boundaries and may supervise others in this environment; conceptual and abstract model building using creative thinking; uses theoretical knowledge and practical skills to solve complex problems within a predictable and sometimes unpredictable context.

4	Factual and theoretical knowledge in broad contexts within a field of work or study, expertise in a range of cognitive and practical skills in generating solutions to specific problems in a field of work or study, self-manageme nt within the guidelines of work or study contexts that are usually predictable, but are subject to change, supervising the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities.		
3	Knowledge of facts, principles, processes and general concepts, in a field of work or study, a range of cognitive and practical skills in accomplishing tasks. Problem solving with basic methods, tools, materials and information, responsibility for completion of tasks in work or study, adapting own behaviour to circumstances in solving problems.	1	Associate: Able to apply knowledge and skills to solve straight forward problems; responsible for own actions; operating in a stable environment.

Source: CEN 2014a

As e-CF directly relates to actual career paths in the contemporary labour market, it reflects the flatter organizational structures commonly deployed at present by the industry. Consequently, the proficiency levels scale adopted by e-CF comprises only 5 levels (CEN 2014b).

The User Guide for the application of e-CF (Ibidem) points out that the way the framework can be applied relates to the business approach of a company and its size. SMEs, more flexible and focused on innovation, are more likely to connect with the e-CF. The size of the company relates to the type of competencies considered relevant.

The framework can be a useful tool for management to analyse the resources available in a company and identify future skills and competencies requirements.

Some companies, such as Tata Steel Europe, combine the e-CF Framework with DigComp (where DigComp corresponds to the area of application) to obtain an overarching framework (Figure 6) through which is possible to map the competencies required across the whole spectrum of workers in a steel company in the different departments, from IT services, to production and maintenance.

Figure 6 – Possible integration of eCF and DigComp

Digital Skills (e-CF & DigComp)	
Area	**Competence**
PLAN	IS and Business Stratey Alignment
	Service Level Management
	Business Plan Development
	Product/Service Planning
	Architecture Design
	Application Design
	Technology Trend Monitoring
	Sustainable Development
	Innovating
BUILD	Application Development
	Component Integration
	Testing
	Solution Deployment
	Documentation Production
	Systems Engineering
RUN	User Support
	Change Support
	Service Delivery
	Problem Management
ENABLE	Information Security Strategy Development
	ICT Quality Strategy Development
	Education and Training Provision
	Purchasing
	Sales Proposal Development
	Channel Management
	Sales Management
	Contract Management
	Personnel Development
	Information and Knowledge Management
	Needs Identification
	Digital Marketing
MANAGE	Forecast Development
	Project and Portfolio Management
	Risk Management
	Relationship Management
	Process Improvement
	ICT Quality Management
	Business Change Management
	Information Security Management
	IS Governance
APPLY (DigComp)	Information and data literacy
	Communication and collaboration
	Digital content creation
	Protecting personal data and privacy
	Creatively using digital technologies

Source: Tata Steel Europe

3.12 Europass

Europass is a portfolio, available in 27 European languages, made up of different tools devised to "help individuals to communicate their skills, qualifications and experience through the use of standardised documents templates"[53]. The documents of which Europass is composed are the Curriculum Vitae, the Language Passport, the Certificate Supplement, the Diploma Supplement and the Mobility record.

The Curriculum Vitae is devised to describe in a structured and transparent way qualifications, work experiences and skills.

The Language Passport is a template that allows the individual to record his language skills through a self-evaluation grid based on the Common European Framework of Reference for Languages.

The Certificate Supplement is issued under the domain of vocational education and training as a supplement to the national qualification or certificate, aimed at making this understandable in an international context. The Diploma Supplement carries out the same function as the certificate, but it is associated with higher education diplomas.

Finally, the mobility record makes it possible to record, in a standardised and detailed manner, information about the individual's experiences abroad for learning or training purposes (including, for instance, the list of tasks undertaken during the mobility and the competencies acquired).

The idea behind the Europass initiative, along with other education and training initiatives of the EC, is to "support the sharing of information on skills and qualifications in a consistent way across borders"[54].

The portfolio has a threefold objective[55]:

- to help citizens communicate their skills and qualifications effectively when looking for a job or training;
- to help employers understand the skills and qualifications of the workforce;
- to help education and training authorities define and communicate the content of curricula.

The Europass initiative is based on the work started in 1998 by the EC and Cedefop to set up an international Forum on transparency of vocational qualifications. The work undertaken within the Forum brought to the definition of the European CV and Certificate Supplement and the establishment of a network of National Reference Points for Vocational Qualifications. The other three documents were developed in the late nineties.

In 2003, the European Commission prepared a proposal for a Decision of the European Parliament and of the Council on a framework for the transparency of qualifications and competencies (Europass), which was then adopted in December 2004. The official Europass website was subsequently launched in February 2005 and improved in graphics, usability and contents during the years[56].

[53] https://ec.europa.eu/social/main.jsp?catId=1266&langId=en
[54] *Ibidem*
[55] https://europass.cedefop.europa.eu/about-europass
[56] https://europass.cedefop.europa.eu/about/history

In April 2018 the EC started a process of revisioning the Europass portfolio to offer more tailored services to enable people to identify and communicate their skills and qualifications, and include information on learning opportunities, qualifications and guidance.

The Europass initiative is implemented at the national level through a network of National Europass Centres, which have the following functions[57]:

- coordinate the management of Europass documents;
- promote Europass initiative and Europass documents;
- ensure that information and guidance centres are well informed about Europass;
- ensure that all Europass documents are also available in paper versions;
- act as a national partner in the European network of National Europass Centres.

January 2020 data reports that the visits to the Europass portal increased by 13% in 2019 and CVs generated online increased by about the same ratio, compared to 2018[58], confirming the growing importance perceived by users to present their professional and educational information in a standardized format which is recognisable throughout Europe.

[57] https://europass.cedefop.europa.eu/about/national-europass-centres
[58] https://europass.cedefop.europa.eu/resources/statistics/custom-reports#/generated

SECTION IV – Summary of the findings and concluding remarks

4.1 Integration of EU frameworks and tools in the five case study countries

This section aims to provide a snapshot of the level of integration in the case study countries of the frameworks and tools reviewed in the previous sections. This allows to grasp in a direct and immediate manner the extent to which countries are converging towards similar approaches and solutions to vocational education and training.

Table 19 below offers a snapshot of the level of implementation of some of the concepts, tools and frameworks that are at the basis of the EU vision on vocational education and training. The color coding adopted is based on a traffic light system, where red would have meant complete absence of alignment with the EU tool/framework/concept, yellow means that steps have been taken towards alignment and implementation at the national level, but not to an operational state, and green means that the tool/concept/framework is present and operational (at least to some extent).

Table 19 – Summary of the integration of EU frameworks, tools and concepts in the case study countries

	Germany	Italy	Spain	Poland	United Kingdom
EQF	🟢	🟢	🟡	🟢	🟢
ECVET	🟡	🟡	🟡	🟡	🟡
EQAVET	🟢	🟢	🟢	🟢	🟢
Digcomp	🟢	🟢	🟢	🟢	🟢
Learning Outcomes	🟢	🟢	🟢	🟢	🟢
Modularity	🟡	🟡	🟢	🟢	🟢
Validation of non-Formal and Informal Learning	🟢	🟢	🟢	🟢	🟢
National Europass Centres	🟢	🟢	🟢	🟢	🟡

Table 19 clearly shows that none of the core concepts, tools and frameworks has been neglected by the ESSA case study countries (no red mark is present). However, yellow dots show that some concepts and frameworks still pose challenges at the national level that need to be overcome for the tools/frameworks to become fully operational.

EQF is present in all the ESSA case study countries and National Qualifications Frameworks are referenced to this, except in Spain where the referencing process is still underway.

ECVET appears to be the most challenging framework to adopt at the national level. Even in those countries in which credit systems are present, the actual credit accumulation and transfer appears to be often not operational. However, all the ESSA countries have taken some steps to align at least with some of the ECVET principles (e.g., learning outcomes orientation, modularisation, recognition of prior learning). Where ECVET principles are used, this is mainly to promote and support transnational mobility, to ensure a quality experience for the learner/worker and recognition/validation of his learning.

Quality Assurance (QA) mechanisms based on (or in line with) EQAVET are present in all the ESSA case studies, however it must be noted that it is often difficult to frame a national QA system as a whole, since measures and mechanisms are implemented at different levels (national, regional, local). What is worth noting is that many of the descriptors and indicators of EQAVET are used in the case study countries for quality monitoring.

DigComp is used in the ESSA case study countries, although in different ways. It varies from being used as a reference for national digital competences standards to being used to pilot initiatives and projects at the regional/local level.

All the ESSA countries have adopted a learning outcomes approach, in line with the EU tools and frameworks. Countries like Poland and the United Kingdom have been classified as early developers of such an approach, whereas Germany, Italy and Spain have been classified as recent developers.

Modularisation is mostly applied in the ESSA case study countries, however in Italy and Germany it is applied to a less extent (only for some qualifications or part of them). This is to be explained by the functioning of the system itself and the understanding of what a qualification is and how it is achieved (e.g. the idea that occupational competences are intertwined and difficult to break down into separate modules/units, and that VET scope is to build professional identities that require holistic training).

All the ESSA case study countries have (or had) a National Europass Centre which is in charge of coordinating all the Europass related activities in the country. Since April 2021, the United Kingdom is no longer part of the Europass initiative, and currently there is no nominated representative for Europass in the UK.

Finally, arrangements for the recognition and validation of prior learning coming from informal and non-formal settings are now in place in all the case study countries, although their scope and their outcomes vary (e.g., from awarding a full qualification to exempting a module or part of a course). It has also to be noted that the approaches in this respect could vary from having a national framework in place to arrangements implemented only at the regional/local level.

4.2 Conclusions

As a conclusion of this report, it is important to outline the trajectory established by the EU frameworks and tools reviewed here. The convergence process started gradually in the second half of the 21st century, after the establishment of the coal and steel community, and accelerated in the 90s and early 2000s with the launch of mobility and research programmes (Erasmus and Leonardo da Vinci) and the establishment of EQF (2008), ECVET (2009), EQAVET (2009), and the Recommendation on the validation of non-formal and informal learning (2012). The convergence is at present still incomplete, nevertheless all the EU countries appear to have made several steps forward in the collective challenge of increasing transparency and mutual recognition through the harmonisation of national VET systems within the EU meta-frameworks. The main outcomes of this process can be summarised as follows:

a. progressive shift to a learning outcomes approach;

b. progressive establishment of a credit system and shift to a unit-based/modular approach;

c. introduction of guidelines for establishing mechanisms for the recognition, validation and certification of informal and non-formal learnings

d. establishment of national quality assurance systems in line with the EU requirements

e. establishment of cross-national databases and systems for mapping and cross-referencing education and vocational qualifications (e.g., ESCO, ISCO, ISCED), increasing transparency and comparability.

The transformations that the EU frameworks and tools are triggering at the national VET systems level produce a structure of potential opportunities to support workers training, upskilling and/or re-training that steel companies could leverage once these are well understood.

Learning outcomes have been already defined as "statements of what a learner knows, understands and is able to do on completion of a learning process, defined in terms of knowledge, skills and competence". If the previous education and training paradigms focused on inputs, the new paradigm focuses on the outcomes, with an explicit aim to place the individual at the centre of the learning process.

Due to the challenges that several economic sectors are facing, flexibility has become an important requirement of VET paths, along with more effective connections between different levels of education and training (upper secondary, post-secondary and higher education) to allow learners to re-skill and upskill, or change their professional trajectories if needed. Flexible VET systems are now required to take into account the role of informal and non-formal learning and to establish mechanisms to recognise and validate this, thus offering learners the opportunity to shorten their training paths.

Credit systems, as they are proposed by the European Recommendation, are devised to support both modularisation and the acquisition of learning outcomes, and to facilitate mobility and transfer of achieved learning outcomes across different contexts. ECVET points should be a numerical representation of the overall weight of learning outcomes within a qualification and of the relative weight of units in relation to the whole qualification. As pointed out in the previous paragraph, however, this remains one of the less adopted measures in the European countries. Where ECVET principles are used, this is mainly to promote and support transnational mobility, to ensure a quality experience for the learner/worker and recognition/validation of their learning. From the point of view of learners, ECVET tools (e.g., Learning Agreement,

Memorandum of Understanding) should ensure the formal recognition of learning achievements during a mobility period. From the point of view of VET providers, ECVET framework should favour the establishment of solid trans-national mobility partnerships. This would be particularly beneficial within sectoral domains. Companies could benefit from ECVET through targeting specific learning outcomes that would help their employees to achieve a broader understanding of some aspects, e.g. mobility to countries where Industry 4.0 concepts are more developed.

Transparency and cross-referencing are prerequisites for transferability of skills and workers geographical mobility. The ESCO database provides a relevant reference by offering a common understanding on skills, competencies and occupations. The ISCO-08 complementarity establishes a hierarchical structure and allows ESCO to be used for cross-national statistical analysis. Linking qualifications included in the qualification pillar with an EQF level and mapping them to ISCED-F 2013 enhances the transparency and comparability of qualifications across different countries.

Specific tools for ICT, such as DigComp and the e-CF framework work well as shared glossaries and competencies references at the European level and could be useful as proficiency benchmarks for companies as well as training providers when designing their own training offer. The two, as shown, can be used separately or combined, based on the needs and purpose of the company.

Modularisation can support the steel industry through the creation of tailor-made curricula, that respond to specific skills needs. A modular approach, combined with established paths for the recognition of informal and non-formal learning, enhances the flexibility of VET programmes and would allow steel workers to upskill or re-train more easily if needed. The advantages of this could consist of:

a) increased flexibility of vocational paths;

b) shortened distance between IVET and CVET;

c) easier recognition and transferability across countries of single modules;

d) easier updating of the qualifications;

e) possibility to ideally combine core national modules with local and/or sectoral requirements.

As highlighted by Cedefop (2020), ongoing processes such as the shift to learning outcomes, the introduction of qualification frameworks, the design of modularised programmes, the recognition of micro-credentials and the validation of non-formal and informal learning are all interlinked. Such processes, supported and guided by the tools and frameworks reviewed in this document, aim to create more flexible VET systems that can integrate and recognise a wide range of individual learning outcomes and experiences acquired in different settings (formal, non-formal and informal). This is certainly beneficial in a time where re-skilling and upskilling of steelworkers is becoming more and more important. However, as pointed out by Cedefop, while there is certainly a case for flexible and more learner-centred approaches to vocational training, "some stakeholders argue that systems integrating a host of piecemeal credentials may lose transparency and undermine the status of strong initial education and training which lays the groundwork for individuals' future adaption and change" (Cedefop 2020, p. 3).

We believe that the emphasis on modularisation requires a caveat. As discussed in Deliverable 4.1, the research conducted so far points to the need of a holistic approach to vocational training to increase steel workers' adaptability to changing conditions, especially in a context of fast technological transformation. Vocational qualifications need to provide a set of interrelated

(technical and transversal) competencies in broad occupational areas to cope with the challenges brought in by the fourth industrial revolution. From this point of view, modularisation should not be put in practice in a way that hinders a holistic approach to education and training and reduces the breadth of professional competence, but rather in a way that complements it. Furthermore, the way modularisation is applied needs to be coherent with the understanding of "occupation" and "qualification" that underpins a VET system.

These findings, and their implications for the steel industry, are discussed more extensively in Deliverable 4.5, which offers an organic overview of the results of ESSA work package 4 and a list of recommendation for the steel industry on how to best navigate the current state of vocational education and training systems at both the national and European level.

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