Blueprint "New Skills Agenda Steel":

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

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

Deliverable D4.2

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Contents:

SECTION I – Description and rationale of the deliverable

1.1 Description of the deliverable

The following report focuses on cross-European VET frameworks and on standards for sector skills recognition. It is one of the four outcomes of WP4 – *VET Requirements and Regulations/National VET Systems (relevant requirements and regulations for the Blueprint)* and is intended as an integration of D4.1 - *Identification of National (Sector) VET Qualification and Skills (Regulatory) Frameworks for Steel*.

This report is aimed at providing an overview of the most relevant devices and regulations designed and implemented at the EU level to support the transparency and transferability of qualifications and competences among the EU countries.

This report is structured into three sections, as follows:

I)   Description and rationale of the deliverable

II)   The emergence of the EU VET field

III)   Recommendation

In this first section, the main contents and the theoretical and methodological approach of the report are outlined, as well as the results and contents of D4.1, aimed at understanding how national VET systems currently deliver skills and competences to the steel industry.

The second section describes the path and the steps that have been made to the progressive integration of a European VET system and the emergence of a coherent and unitarian European VET field. The trends in the most recent EU VET policies are analysed, as well as the most relevant frameworks and devices developed for supporting transparency and integration. Several projects addressed at implementing and testing the recognition and transferability of skills and competences between different European countries are identified and analysed.

The third section contains a summary of the findings and outlines a model for benchmarking steel-related qualifications in the EU as well as a list of grounded recommendations for supporting workers mobility and competences circulation across the EU steel industry.

1.2 Rationale

The general aim of WP4 is to understand how VET systems at both national and EU level currently deliver skills and competences to the steel industry and where informal training (on the shop floor) attempts to close the gaps in the formal provisions. 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 integrate at the EU level

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    c)   study to what extent cross-EU frameworks (EQF, EQAVET, ECVET, etc.) are able to provide an effective harmonization of steel-related professional qualifications.

The specific purpose of D4.2 is to establish how Europe-wide instruments, programmes and frameworks (e.g. EQCA, ESCO, EQF, etc.) currently serve the steel industry and how they might be improved and exploited further for meeting industry skills requirements and talents mobility (as identified by WP2 and WP3 of the ESSA project).

This Deliverable is to be considered strictly connected with Deliverables 4.3 and 4.4 (Sector Skill-Set Matrix) and provides a description of the main EU frameworks devoted at harmonising the national VET systems across the EU.

In the perspective of ESSA, skills mismatch and an effective competences allocation requires easily accessible windows of opportunities for workers' transnational mobility and the exchange of good practices. This, in turn, requires that national VET systems are harmonized and integrated in an overarching framework which guarantees transparency and comparability to national vocational programmes and qualifications.

SECTION II – The emergence of the EU VET field

2.1 From divergence to convergence

2.1.1 Introductory remarks

An effort by the European institutions to harmonize 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 complete (Cedefop 2016).

The EU institutions have strongly supported this process through the creation of specific policies and instruments and through funding research and pilot projects on the implementation and effectivity of such instruments in the different national contexts, as clearly 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 in the EU countries, however, it is important to highlight some of the criticalities emerged both at a conceptual and theoretical level, and at a methodological and practical level, related to the comparison, transferability and harmonization of components from different contexts.

A first issue is linked with the very concept of skill that is at the basis of any education and training system. 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" (Ivi, 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 a number of 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 straight forward, 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" (Ivi, p. 107).

As education and training are deeply embedded within different societal contexts, factors such as the general economic and political scenario, cultural models, the way education and training are organised, how workers are deployed, etc. should be taken into account. Furthermore, as very often the actors and agencies involved in such projects have little or no capacity of influencing policies (which are mostly top-down), they tend to respond in a certain dynamic and adaptive way to the limits and constraints of their context.

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, whith 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 for the training of apprentices and journeyman. The guilds provided also 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 journeyman could travel from one place to another to learn from masters, in order 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 the 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

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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.

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). 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 an historical perspective, while the aim of the categorisation produced in D4.1 is to categorise the 5 case study countries on the basis of their economic model, type of skills formation system and functioning.

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 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 on the 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 co-operation between Member States in various social fields, including 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" (Ivi, p. 15).

During the Sixties and the early Seventies, the idea of a common European framework on VET was slow to develop for the obstructionism of some countries concerned about the replacement of their own 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 drive occurred 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 to 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"[4]. 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"[5].

The Cophenagen Declaration of November 2002 set an important milestone in the path to the convergence of national VET systems. It stated the importance of hight quality VET in promoting social inclusion, cohesion, mobility, employability and competitiveness, and maintained the need for the EU memer states to increase voluntary cooperation in order to promote, mutual trust, transparency and recognition of competences and qualifications.

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 in order 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 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.
	Investigating how transparency, comparability, transferability and recognition of competences and/or qualifications, between different countries and at

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

Recognition of competences and qualifications	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)[6] 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 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 once again the importance of ensuring National Qualification Frameworks (NQF) based on learning outcomes and link them to EQF in order 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 outline above were supported by trans-national programmes favouring mobility and transfer of innovation and good practices such as the Leonardo da Vinci programme (1995-2013) and the Ersmus+ programme (2014-2020). Leonardo da Vinci was part of the EC's Lifelong Learning Programme (LLP), it focused on vocational education and training, addressing both the learning and teaching needs in the sector, relating to either lifelong learning or the labour market[7]. The programme encompassed three strategic actions, namely transnational mobility, transfer of innovation and international partnerships. A study[8] conducted between 2006 and 2007 by WSF Kerpen (Germany) on people who have benefitted from the programme had shown an appreciation of it and an improvement in career terms. The data collected reported that 58% of the unemployed people involved was able to find a job after the mobility, 27% improved the quality of their jobs and 34% got jobs with higher responsibility.

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[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:ef0016
[7] https://eacea.ec.europa.eu/sites/2007-2013/llp/leonardo-da-vinci-programme_en
[8] https://europa.eu › rapid › press-release_IP-08-156_en

Erasmus+ was launched in 2014, incorporating the former Erasmus programme and some strands of the Leonardo da Vinci programme, focusing on three key actions: learning mobility of individuals, cooperation for innovation and good practices, and support to policy reforms[9].

2.2 EU VET Policy Direction

Information regarding occupations, qualifications, skills, competences, can only be comparable throughout European member states if all share a common view on these and a set of common principles and guidelines. These need to be based, in turn, on a common language. Since the 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 were organised, gradually harmonising with the principles and guidelines promoted by the aforementioned frameworks. The main changes can be summarised in the following 5 aspects (DG for Employment, Social Affairs and Inclusion, 2019):

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

The tools/frameworks and programmes that have underpinned this transition are described more in detail in paragraph 2.3.

2.1.1 Learning outcomes approach

EQF and ECVET Recommendations have encouraged a shift to a description of qualifications in terms of learning outcomes[10]. The process has brought a sensible convergence across the EU countries and at present practically all member states have put in practice related initiatives (DG for Employment, Social Affairs and Inclusion, 2019).

Cedefop (2012c) has grouped the EU countries in two groups on the basis of the period of adoption of a learning outcomes approach. Within the five case study countries identified in ESSA, United Kingdom and Poland have been classified as "early developers", while Germany, Italy and Spain are "recent developers". Nevertheless, Cedefop (2017) points out that despite this convergence, there are differences in the way the countries apply the learning outcomes description.

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[9] For a more thorough description of the programme see paragraph 2.3.4

[10] 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.

2.1.2 Modular approach

The shift towards learning outcomes is integrated by a modular approach in order to increase the flexibility of VET paths, both from the point of view of labour market and from the point of view of learners. Modularisation can, for instance, support the creation of tailor-made curricula, that respond to specific skills needs) (DG for Employment, Social Affairs and Inclusion, 2019a). Most of the EU countries had introduced module-based qualifications in 2018 (in Germany and Italy modular structures are applied only to some qualifications) (*Ibidem*).

2.1.3 Credit systems

Credit systems are devised as instruments to support both modularisation and the acquisition of learning outcomes, 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) (*Ibidem*).

2.1.4 Validation of non-formal and informal learning

Flexible VET systems need to take into account 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.

2.1.5 Quality assurance

The EQAET platform have provided a common ground in terms of quality standards for VET systems. These has 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 level and at 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; and that the overall processes are systematically reviewed[11].

2.3 European tools for cross-matching qualifications and competences and transferability

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 in order 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

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[11] Paragraph 2.3.6 provides a more accurate description of EQAVET principles.

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 competences 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, standardized and transparent bases, with the aim of supporting 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 mobility and mobility 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]* with the aim of raising the level of skills and competences of the EU workers (and consequently their competitiveness) in order to place them more efficiently in the labour market.

2.3.1 European Qualification Framework

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.

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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" (Ivi, p. 172).

[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.

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 with the purpose of ensuring the continuity as well as the deepening of EQF[19]. Here is recommended, in particular, 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;
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 1 – 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 in order 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 prob-	take responsibility for completion of tasks in work or study adapt own behaviour to circumstances in solving problems

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[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

		lems by selecting and applying basic methods, tools, materials and information	
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 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 | specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields | manage and transform work or study contexts that are complex, 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

2.3.2 European Credit System for Vocational Education and Training

The ECVET model can be considered as a complementary device to EQF and has been designed as an interface between the different national credit systems which, however, it never claimed 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 opportunity of recognising or not informal and non-formal learnings. In this situation, comparability of qualifications is difficult to achieve. 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 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 point to its components, or a qualification using *units of learning outcomes* and attaching credit points to every unit (Cedefop 2014).

The rationale for adopting a credit system is to organize the process of obtaining a qualification in a more flexible way 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 competences. A *unit of learning outcomes* is defined as the "set of knowledge, skills, and/or competences 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" (Ivi, p. 124) and can be specific to a single qualification or common to several qualifications.

The aim of this approach is to associate, in a transparent and standardized way, a quantitative description in terms of cumulable credits, with a qualitative set of skills and competences, 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.

ECVET was planned to be implemented in two subsequent phases. In an first preparatory phase, the EU member states were asked to create by 2012 the necessary conditions in order to gradually apply ECVET to the qualifications of vocational education and training at all levels of

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[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).

EQF and used for the purpose of transferring, recognizing and accumulating the learning outcomes achieved by an individual in formal, non-formal and informal contexts, in accordance with national legislation and practices. The second phase was aimed at the collection and analysis of the results of the conducted experimentations and pilot projects by June 2014, including, if necessary, a review and an adjustment of the Recommendation.

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, in accordance with 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 competences 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).

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

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[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.

[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

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 to 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" (Ivi, p. 2).

Table 2 – 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 sceptical 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.
	VET providers define units of learning outcomes for geographic mobility.
	There is an ECVET steering group with social partners. Since 2012, a team of experts has provided advice on ECVET.
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.
	A regulation on certification and validation of competences was introduced in 2012 (Legge Fornero) and the Decree 13/2013 defined the standards.
	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 a 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. The NQF was linked to the EQF in 2013. The IVET qualifications and core curricula are based on units of learning outcomes.
	Qualifications are awarded based on the assessment of 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.
	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.

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credit system in line with ECVET, but no implementations were made; Germany reported uncertainty about the feasibility of ECVET due to the scepticism of some stakeholders.

		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) was introduced across England, Wales and Northern Ireland in 2008 for VET qualifications and 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 for VET, and all 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

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

A demo version of the ESCO system was launched in October 2013, while the first version was released in July 2017[24]. The system is updated by the Directorate Generale Employment, Social Affairs and Inclusion with the support of Cedefop and stakeholders. Basically, ESCO "works as a dictionary, describing, identifying and classifying professional occupations, skills, and qualifications relevant to the EU labour market and education and training"[25]. 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 on 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 competences related with a specific qualification
    c) the qualifications related with a specific occupation

The Commission has developed ESCO with the following aims[26]:

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 based on three pillars, qualifications, skills 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 contain 13.485 skills linked to the occupations. The qualifications pillar collect data about the formal qualifications delivered in the EU countries.

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, competences and knowledge[27]
- Optional skills, competences and knowledge.

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

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[24]https://ec.europa.eu/esco/portal/escopedia/European_Skills_44__Competences_44__Qualifications_and_Occupations__40_ESCO_41_

[25] https://ec.europa.eu/esco/portal/howtouse/21da6a9a-02d1-4533-8057-dea0a824a17a

[26] DG for Employment, Social Affairs and Inclusion (2019), ESCO Handbook. Retrieved from https://ec.europa.eu/esco/portal/documents

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

It is relevant to underline that the relationship between a specific qualification and occupation reproduces information that are managed at a national level, while ESCO does not establish actively such relationships[28].

Table 3 – Occupations, skills and qualifications in the ESCO view

Occupation	Skills and Competences	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[29].	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[30].	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[31].

The ESCO occupations pillar is made of the ESCO occupations profiles and the related ISCO-08 hierarchies (see Fig. 1). 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.

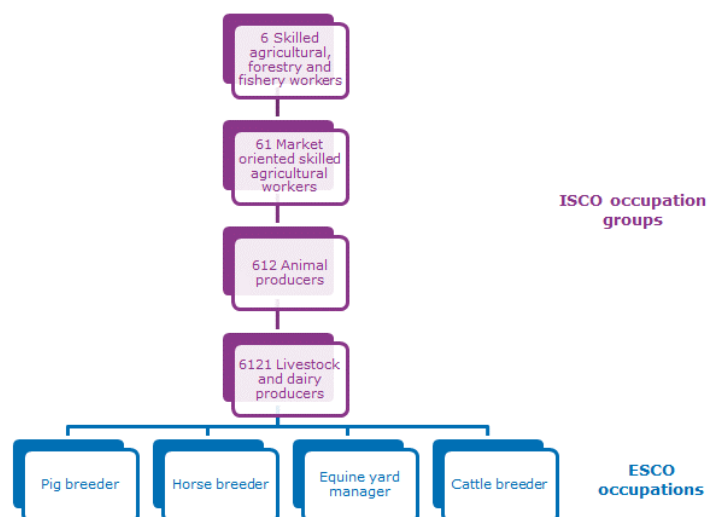
[28] https://ec.europa.eu/esco/portal/escopedia/Three_pillar_structure
[29] https://ec.europa.eu/esco/portal/escopedia/Occupation
[30] https://ec.europa.eu/esco/portal/escopedia/Skill
[31] https://ec.europa.eu/esco/portal/escopedia/Qualification

Figure 1 – ESCO/ ISCO-08 relationship

Source: ESCO Handbook (2019)

As for the qualifications pillar, it is made of qualifications coming from the databases of member States. These are included in the National Qualifications Frameworks (NQF) and referenced to EQF.

The core information displayed in each qualification include:

- the title and and the field

- the country in which the qualification is located

- the EQF level

- a brief description of the qualification

- the contents of the qualification in terms of knowledge, skills and competences

- the type of programme to which the qualification refers

- the awarding body.

Figure 2 – Links between the three ESCO pillars
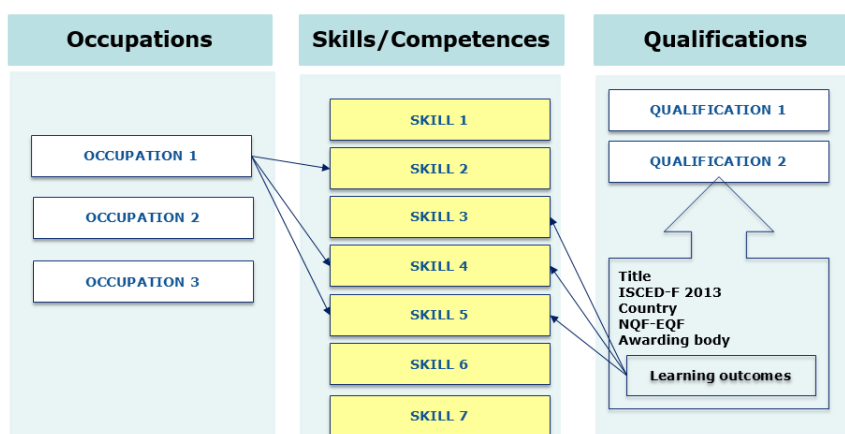
Source: ESCO Handbook (2019)

A direct link between an occupation and a relevant qualification can be displayed in ESCO only if this is established at the national level. In other cases, such relationships are indirect through the skills pillar (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 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[32] enhances the transparency and comparability of qualifications across different countries. Finally, the DigComp framework works as a shared vocabulary of digital competences at the European level. DigComp is integrated in the set of digital transversal skills.

2.3.4 Erasmus+ Programme[33]

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 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 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:

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[32] 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.

[33] 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

- 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[34]
- 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:

- 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 cooperation between Programme and Partner-Country institutions in the field of VET and in higher education.

2.3.5 European Digital Competences Framework (DigComp)

The European Digital competences 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 with the aim to identify the key digital skills and competences[35] needed to be "digitally proficient" in the contemporary society.

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[34] These aim to promote excellence in teaching frand 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.

[35] https://ec.europa.eu/jrc/en/digcomp/project-background

The Recommendation of the European Parliament and of the Council of December 2006 on key competences for lifelong learning[36] established that digital competence[37], is one of the recognised 8 key competences, 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 4).

Table 4 – DigComp areas and subdimensions

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

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[36] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32006H0962

[37] 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).

The DigComp framework can help education and training agencies to set training goals and identify training opportunities and help policymakers to monitor ctizen's 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 competences 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 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 competences and defines a EU benchmark for the sector. DigComp is integrated in ESCO skills pillar and is used in ESSA as a main reference for the identification of digital skills gaps.

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

The European Quality Assurance in Vocational Education and Training (EQAVET) defines itself as a "community of practice" in which members and expert in a cross-national dimension, exchange information and experiences, initiate a process of consensus building for the definition of common principles, indicators and tools for enhancing quality of VET systems, and reach shared results, guidelines and criteria for quality assurance. EQAVET is basically a cross-European network made of representatives of the EU Member States, National References Points, Social Partners, scientific advisers and the European Commission[38]. It operates in a collaborative mode to create a sustainable platform or community of practice for quality assurance in VET[39].

The main aim of EQAVET is to bring together the EU countries, social partners and the European Commission to develop quality assurance in national VET systems, based on the European Quality Assurance Reference Framework (EQARF). This is done mainly by[40]:

- 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[41]. The Recommendation suggests that the Framework should be regarded as a toolbox from which the users can chose the descriptors and indicators that are more relevant for their particular quality assurance systems. The descriptors and indicators included in EQARF are indeed provided as a guidance tool.

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

EQARF describes the cycle of VET quality assessment into four phases (table 5) proposing for each of them a series of descriptors both at the level of national system, and at the level of VET providers.

Table 5 – EQARF quality criteria and indicative descriptors

Quality Criteria	Indicative descriptors at VET-system level	Indicative descriptors at VET-provider level
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. The relevant stakeholders participate in setting VET goals and objectives at the different levels. Targets are established and monitored through specific indicators (success criteria). Mechanisms and procedures have been established to identify training needs. An information policy has been devised to ensure optimum disclosure of quality results/outcomes subject to national/ regional data protection requirements. Standards and guidelines for recognition, validation and certification of competences of individuals have been defined.	European, national and regional VET policy goals/objectives are reflected in the local targets set by the VET providers. Explicit goals/objectives and targets are set and monitored. Ongoing consultation with relevant stakeholders takes place to identify specific local/ individual needs. Responsibilities in quality management and development have been explicitly allocated. There is an early involvement of staff in planning, including with regard to quality development. Providers plan cooperative initiatives with other VET providers. The relevant stakeholders participate in the process of analysing local needs. VET providers have an explicit and transparent quality assurance system in place.
Implementation plans are devised in consultation with stakeholders and include explicit principles.	Implementation plans are established in cooperation with social partners, VET providers and other relevant stakeholders at the different levels.	Resources are appropriately internally aligned/ assigned with a view to achieving the targets set in the implementation plans.

	Implementation plans include consideration of the resources required, the capacity of the users and the tools and guidelines needed for support.	Relevant and inclusive partnerships are explicitly supported to implement the actions Planned.
	Guidelines and standards have been devised for implementation at different levels.	The strategic plan for staff competence development specifies the need for training for teachers and trainers.
	Implementation plans include specific support towards the training of teachers and trainers. VET providers' responsibilities in the implementation process are explicitly described and made transparent.	Staff undertake regular training and develop cooperation with relevant external stakeholders to support capacity building and quality improvement, and to enhance performance.
	A national and/or regional quality assurance framework has been devised and includes guidelines and quality standards at VETprovider level to promote continuous improvement and self-regulation.	
Evaluation of outcomes and processes is regularly carried out and supported by measurement.	A methodology for evaluation has been devised, covering internal and external evaluation.	Self-assessment/self-evaluation is periodically carried out under national and regional regulations/ frameworks or at the initiative of VET providers.
	Stakeholder involvement in the monitoring and evaluation process is agreed and clearly described.	Evaluation and review covers processes and results/outcomes of education including the assessment of learner satisfaction as well as staff performance and satisfaction.
	The national/regional standards and processes for improving and assuring quality are relevant and proportionate to the needs of the sector.	Evaluation and review includes adequate and effective mechanisms to involve internal and external stakeholders.
	Systems are subject to self-evaluation, internal and external review, as appropriate.	Early warning systems are implemented
	Early warning systems are implemented.	

	Performance indicators are applied.	
	Relevant, regular and coherent data collection takes place, in order to measure success and identify areas for improvement.	
	Appropriate data collection methodologies have been devised, e.g. questionnaires and indicators/metrics	
Review	Procedures, mechanisms and instruments for undertaking reviews are defined at all levels.	Learners' feedback is gathered on their individual learning experience and on the learning and teaching environment. Together with teachers' feedback this is used to inform further actions.
	Processes are regularly reviewed and action plans for change devised. Systems are adjusted accordingly.	Information on the outcomes of the review is widely and publicly available.
	Information on the outcomes of evaluation is made publicly available.	Procedures on feedback and review are part of a strategic learning process in the organisation.
		Results/outcomes of the evaluation process are discussed with relevant stakeholders and appropriate action plans are put in place.

Source: Recommendation of the European Parliament and of the Council of 18 June 2009

Table 6 – Selected quality indicators in EQARF and relationship with policies

Indicator	Purpose of the policy
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	Promote a quality improvement culture at VET-provider level. Increase the transparency of quality of training. Improve mutual trust on training provision

(b) share of accredited VET providers	
2. Investment in training of teachers and trainers: (a) share of teachers and trainers participating in further training (b) amount of funds invested	Promote ownership of teachers and trainers in the process of quality development in VET. Improve the responsiveness of VET to changing demands of labour market. Increase individual learning capacity building. Improve learners' achievement.
3. Participation rate in VET programmes: Number of participants in VET programmes, according to the type of programme and the individual criteria	Obtain basic information at VETsystem and VET-provider levels on the attractiveness of VET. Target support to increase access to VET, including for disadvantaged groups.
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	Obtain basic information on educational achievements and the quality of training processes. Calculate drop-out rates compared to participation rate. Support successful completion as one of the main objectives for quality in VET. Support adapted training provision, including for disadvantaged groups.
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 (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	Support employability. Improve responsiveness of VET to the changing demands in the labour market. Support adapted training provision, including for disadvantaged groups.
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 (b) satisfaction rate of individuals and employers with acquired skills/competences	Increase employability. Improve responsiveness of VET to changing demands in the labour market. Support adapted training provision, including for disadvantaged groups.

7. Unemployment rate according to individual criteria	Background information for policy decision-making at VET-system level.
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 (b) success rate of disadvantaged groups according to age and gender	Background information for policy decision-making at VET-system level. Support access to VET for disadvantaged groups. Support adapted training provision for disadvantaged groups.
9. Mechanisms to identify training needs in the labour market: (a) information on mechanisms set up to identify changing demands at different levels (b) evidence of their effectiveness	Improve responsiveness of VET to changing demands in the labour market. Support employability.
10. Schemes used to promote better access to VET: (a) information on existing schemes at different levels (b) evidence of their effectiveness	Promote access to VET, including for disadvantaged groups. Support adapted training provision.

Source: Recommendation of the European Parliament and of the Council of 18 June 2009

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, through ensuring international recognition, it enhances the attractiveness of VET in a European dimension.

2.3.7 International Standard Classification of Occupations (ISCO-08)[42]

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 on the basis of 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.

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

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 taks (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.

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 last version.

The 10 major groups identified are linked with a skill level, as follows (table 7):

Table 7 – 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	1
6. Skilled agricultural, forestry and fishery workers	1
7. Craft and related trades workers	1
8. Plant and machine operators, and assemblers	1
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.

2.3.8 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 Seventies, and updated in 1997 and in 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 in an international perspective.

From 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" (Ivi, 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 in order to make transparent the competences, 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" (Ivi, 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 8).

Table 8 – 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" (Ivi, 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), that encompasses 11 fields, to the second (narrow), that 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 for 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" (Ivi, 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*).

Table 9 – ISCED-F 2013 steel-related fields

07. Engineering, manufacturing and constructions	071. Engineering and engineering trades	0711. Chemical engineering and processes
		0712. Environmental protection technology
		0713. Electricity and energy
		0714. Electronics and automation
		0715. Mechanics and metal trades
		0716. Motor vehicles, ships and aircraft
	072. Manufacturing and processing	0724. Mining and extraction

Source: UNESCO 2014

2.3.9 European e-Competence Framework[43]

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 Europen Commission in the Communication of September 2007[44]. 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 an 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" (Ivi, 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 competences 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 competences in ICT.

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

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

Table 10 – European e-Competence Framework structure

Dimension 1	**Dimension 2**	**Dimenson 3**	**Dimension 4**
Competences areas	References for earch 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 competences, linking them to EQF. A competence is in this context defined as "a demonstrated ability to apply knowledge, skills and attitudes to achieving observable results" (CEN 2014b, p. 11).

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" (Ivi, p. 18).

The European e-Skills Forum[45], 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" (Ivi, p. 12), in so excluding ICT user skills from its scope.

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[45] 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.

Figure 3 – 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				X	X
	A.2. Service Level Management			X	X	
	A.3. Business Plan Development			X	X	X
	A.4. Product/Service Planning		X	X		
	A.5. Architecture Design			X	X	X
	A.6. Application Design	X	X	X		
	A.7. Technology Trend Monitoring				X	X
	A.8. Sustainable Development			X	X	
	A.9. Innovating				X	X
B. BUILD	B.1. Application Development	X	X	X		
	B.2. Component Integration		X	X	X	
	B.3. Testing	X	X	X	X	
	B.4. Solution Deployment	X	X	X		
	B.5. Documentation Production	X	X	X		
	B.6. Systems Engineering			X	X	
C. RUN	C.1. User Support	X	X	X		
	C.2. Change Support	X	X	X		
	C.3. Service Delivery	X	X			
	C.4. Problem Management		X	X	X	
D. ENABLE	D.1. Information Security Strategy Development				X	X
	D.2. ICT Quality Strategy Development				X	X
	D.3. Education and Training Provision		X	X	X	
	D.4. Purchasing		X	X	X	
	D.5. Sales Proposal Development		X	X		
	D.6. Channel Management			X	X	
	D.7. Sales Management			X	X	X
	D.8. Contract Management		X	X	X	
	D.9. Personnel Development		X	X	X	
	D.10. Information and Knowledge Management			X	X	X
	D.11. Needs Identification			X	X	X
	D.12. Digital Marketing		X	X	X	
E. MANAGE	E.1. Forecast Development			X		
	E.2. Project and Portfolio Management		X	X	X	X
	E.3. Risk Management		X	X	X	
	E.4. Relationship Management			X	X	
	E.5. Process Improvement			X	X	
	E.6. ICT Quality Management		X	X	X	
	E.7. Business Change Management			X	X	X
	E.8. Information Security Management		X	X	X	
	E.9. IS Governance				X	X

Source: CEN 2014a

The competences listed (figure 3) are then broken down into level of proficiency and a set of possibly associated skills and knowledge, as in the following example regarding competence C.4, "problem management" (figure 4).

Figure 4 – 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 ocutcomes of EQF, as follows (table 11). Furthermore, while in the EQF a competence is described in terms of responsibility and autonomy, the e-CF definition of competence quoted above does not explicitly emphasize these dimensions (*Ibidem*).

Table 11- e-CF/EQF relationship

EQF levels	Descriptors	e-CF levels	Descriptors
8	Knowledge at the most advanced frontier, the most advanced and specialised skills and techniques to	5	Principal: Overall accountability and responsibility; recognised inside and outside the organisation for innovative solutions and for shaping the future

	solve critical problems in research and/or innovation, demonstrating substantial authority, innovation, autonomy, scholarly or professional integrity.		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,	1	Associate: Able to apply knowledge and skills to solve straight forward problems; responsible for own actions; operating in a stable environment.

	materials and information, responsibility for completion of tasks in work or study, adapting own behaviour to circumstances in solving problems.	

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 competences considered as relevant, where, for instance, small companies would have less interest in the standardization of procedures.

The framework can be a useful tool for management to analyse the competences capability of their company and identify future requirements.

Some companies, as Tata Steel Europe, combine the e-CF Framework with DigComp (where DigComp corresponds to the area of application) in order to devise a an overarching framework (Figure 5) through which is possible to map the competences required from the workers in the different departments, from IT services, to production and maintenance.

Figure 5 – 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

2.3.10 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"[46]. 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 of the certificate, but it is associated to 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 competences 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"[47].

The portfolio has a threefold objective[48]:

- 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 to 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 competences (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[49].

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

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[46] https://ec.europa.eu/social/main.jsp?catId=1266&langId=en
[47] *Ibidem*
[48] https://europass.cedefop.europa.eu/about-europass
[49] https://europass.cedefop.europa.eu/about/history

The Europass initiative is implemented at national level through a network of National Europass Centres, which have the following functions[50]:

- 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[51], confirming the growing importance perceived by users to present their professional and educational information in a standardized format which is recognisable throughout Europe.

2.4 EU funded pilot projects related in the steel sector

The table below (table 11) reports a selection of transnational projects related to steel and metalworks under the EU Erasmus+, Leonardo Da Vinci and Comenius programmes. The significant number of steel-related projects in the two cohorts (2007-2013 and 2014-2020) testifies the strategic relevance of the sector for the EU economy and the importance lent to training to leverage innovation and competitiveness.

Table 11 – Steel sector related transnational projects (2007- 2018) [ENG]

Programme	Project Title	Year
Erasmus+ (KA2)	E-Learning, Digitisation and Units for Learning at VET schools – Creating online Learning Environments in Technical Education for European metal industry	2019
Erasmus+ (KA3)	Joint Higher VET Course in the Metal Sector	2018
Erasmus+ (KA2)	Employer empowerment to attract, transfer and keep young people in metal industries	2018
Erasmus+ (KA2)	Blueprint "New Skills Agenda Steel": Industry-driven sustainable European Steel Skills Agenda and Strategy (ESSA)	2018
Erasmus+ (KA1)	Metal sheet production and improvements for trainees - part 2	2018
Erasmus+ (KA2)	Mechatronics and Metallurgical VET for sectors' industries	2017

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

Erasmus+ (KA2)	WorkSafe - Developing and implementing a WorkSafe Toolbox and WorkSafe Online Training Course to be used within work-based learning within the fields of metal work and construction	2017
Erasmus+ (KA2)	Industry 4.0 CHAlleNGE: Empowering Metalworkers for Smart Factories of the Future	2016
Erasmus+ (KA2)	Structural Methods and Relevant Training for Competence Management in Metal Sector	2016
Erasmus+ (KA2)	Occupational Safety and Risk Control in Construction and Metal Industry Sectors	2016
Erasmus+ (KA2)	Innovative VET materials for the professional field of „Mechanical Engineering, Metalworking and Metallurgy"	2016
Erasmus+ (KA1)	European Metallurgical and Electromechanical Vet Mobility	2015
Erasmus+ (KA1)	Metal sheet production technology and improvements for trainees	2015
Erasmus+ (KA1)	Steel City Schools Partnership Staff Mobility to Spain	2015
Erasmus+	Make It – A shift into learning outcomes in the welding sector	2015
Erasmus+ (KA2)	Strategic VET development in Mechanical Engineering and Metalworking Industries	2015
Erasmus+ (KA2)	Develop innovative apprenticeship network of vocational schools and very small enterprises in the metal construction sector	2014
Erasmus+ (KA2)	Skills in metal and electro industry	2014
Erasmus+ (KA2)	Capacity building of environmental management units in metal sector	2014
Erasmus+ (KA2)	European Training Programme for Completing the requirements for fabrication and assembly of steel and aluminium structures under the EN 1090 standard	2014
Leonardo da Vinci	TIM - Training Innovation Competences in the Metalworking Sector	2013
Leonardo da Vinci	Fostering the Virtual Mobility within the Metal Sector	2013
Comenius	Metal works without frontiers	2013

Leonardo da Vinci	Development of the GreenPoint Qualification Standard and its implementation in small enterprises of the metal sector	2012
Leonardo da Vinci	Acquisition of specialized practical and job-related and training content in the field of metal processing under Italian conditions	2011
Leonardo da Vinci	SKILLS - Steel construction industry lifelong learning support	2011
Leonardo da Vinci	COMpetences for INNovation in the Metal Sector	2010
Leonardo da Vinci	Greening Technical VET - Sustainable Training Module for the European Steel Industry	2010
Comenius	Ceramics and Metal: from traditional skills to modern job descriptions	2009
Leonardo da Vinci	ISO QUAM 17024:2003 certification: qualified metal worker	2009
Leonardo da Vinci	Electronic Quality Assured, European Steel Training and Assessment (EQUESTA)	2009
Leonardo da Vinci	MAIATZ SIMULFORM: Transfer of research results on numerical 3D simulation technologies applied on cold forming process to VET and Continuous Learning on metal-mechanics sector.	2008
Leonardo da Vinci	Transfer of innovation and new methods to identify vocational competence in the Metal and Electrical Industry illustrated by two vocations	2007
Leonardo da Vinci	METAL SKILLS: Recognition of the non-formal and informal learning of non-qualified workers in the metallurgic sector	2007
Leonardo da Vinci	Initiative to develop a Sector Qualifications Framework (SQF) in the Metal and Electrical Industry	2007-2010
Leonardo da Vinci	Reinforce Metal Competences	2007-2013
Leonardo da Vinci	European Metal Practicum	2007-2013

SECTION III – Concluding remarks and recommendation

3.1 Workers' mobility in the EU steel: past and present

A field research undertaken by Stroud and Fairbrother in early 2000 (Stroud and Fairbrother 2008) addressed the issue of the transformation of the European steel workforce. The composition of the workforce was, at the time of the research, still relatively mature, with most workers in production roles aged between 40 and 54 years. The workforce resulted to be to some extent polarized by age, with "a significant minority of intermediate to highly skilled workers aged in their twenties and early thirties, and a majority of workers skilled by experience in their late forties and early fifties" (Ivi, p. 150).

Migrant workers have been an important component of the steel workforce in countries such as Germany (mainly from Turkey), Netherlands and France (mainly from North Africa), especially as a consequence of the migrations of 1950s and 1960s. On the contrary, the component of migrant workers in the steel industry has never reached a relevant share in countries like the United Kingdom, Italy, Spain, Poland and Czech Republic. Anyway, the field research (Ivi) showed that in those countries with a strong component of migrant workers, these were to be found mainly at the lower end of the occupational hierarchy, experiencing vertical and horizontal segregation with both informal (language skills) and formal (qualifications) barriers to higher positions. Migrant workers, furthermore, were experiencing increasing vulnerability as a consequence of the restructuring and rationalization of the companies and of the lack of language skills required to deal with the new regulatory requirements (safety procedures, environmental protection regulations etc.).

As for the present, the analysis conducted in 2018 by the DG for Employment Social Affairs and Inclusion (2019b), shows that intra-EU mobility is still increasing, though at slower pace than before. In 2017, there were 12.4 million of working age (20-64 years) EU-28 movers in the EU, compared to 11,8 million in 2016.

Germany, United Kingdom, Italy, France and Spain host 74% of all movers, while Romanian, Polish, Portuguese, Italian and Bulgarian nationals made up over 50% of EU-28 movers.

Annual inflows of EU-28 movers to other Member States in 2016 declined for the first time since 2012, partly driven by decreases in inflows to the UK (-7%) and Germany (-12%). Net mobility of EU-28 movers has declined between 2015 and 2016, corresponding to an increase in return mobility.

The two most important sectors of economic activity for movers are manufacturing & wholesale and retail trade (between 12% and 15% each), but compared to 2016, the total number of movers increased more strongly in transportation and storage (+12%).

EU-28 movers have similar education profiles as nationals (though recent movers seem to be even more highly educated than nationals). Despite this, EU-28 movers work more often in elementary occupations and are overrepresented in specific low-skilled occupation for which there are labour shortages. EU-28 movers work more frequently than nationals in construction (11% vs. 5%) and in accommodation and food services (10% vs. 6%) and less frequently in human health and social work (8% vs. 14%).

The total number of movers increased mostly in the following sectors:

- transportation and storage (+12%);

- health and social work (+8%);
- administrative and support service activities (+7%);
- construction (+6%).

The largest share of movers (48%) can be found at secondary education level and encompasses several occupations, like clerks, services and sales, craft and trades, plant and machine operators, and skilled agricultural workers. Plant and machine operators and assemblers count for the 9% of the total number of movers.

One fifth of movers work in elementary occupations (with low skill level) and another fifth work in high-skilled occupations, such as legislators, senior officials, managers and professionals; 10% work as technicians and associate professionals.

In most Member States distributions appear to be similar. In some destinations, though, movers are mainly employed in high-skilled occupations, such as Belgium, the Netherlands, Sweden, Switzerland and Luxembourg. Compared to these, the main destinations for movers, Germany and UK, have quite low shares of movers in high-skilled occupations (17% and 22%, respectively).

As a specific insight in the Steel industry, Cedefop data[52] show that from a general EU28 perspective, companies in Bulgaria, Germany, Latvia, Hungary, Malta, Netherlands, Austria, Slovakia and the United Kingdom encounter difficulties in finding qualified metal and machinery workers. At the other end, countries such as Greece, Italy, Portugal and Slovenia are experiencing a surplus of these occupations.

3.2 Conclusions and EU steel-related qualifications benchmarking

As a summary of this deliverable, it is important to outline the trajectory established by the EU frameworks reviewed earlier. The convergence process started gradually in the second half of the 21st century, after the establishment of the coal and steel community, and sped up in the 90s and early 2000s with the launch of mobility and research transnational programmes (Erasmus and Leonardo da Vinci) and the establishment of EQF (2008), ECVET (2009) and EQAVET (2009). The convergence process is still incomplete, nevertheless all the EU countries have made many steps forward in the collective challenge of increasing transparency and mutual recognition through the harmonization of national VET systems with the EU meta-frameworks. The main outcomes of this process can be listed 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 regulatory 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 education and vocational qualifications, increasing transparency and comparability.

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[52]https://skillspanorama.cedefop.europa.eu/en/analytical_highlights/metal-machinery-workers-skills-opportunities-and-challenges-2016

As for the learning outcomes approach, both EQF and ECVET Recommendations have encouraged a shift to a description of qualifications in terms of learning outcomes. The process has brought a sensible convergence across the EU countries. Learning outcomes have already been 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 paradigms focused on inputs, the new paradigm focuses on the outcomes, with an explicit aim to place the individual at the centre of the training process.

Flexibility has become an important requirement of VET paths, along with more effective connections between different levels (upper secondary to post-secondary and higher education). Flexible VET systems need, to become more effective, to take into account the role of informal and non-formal learning and to establish mechanisms to incorporate this 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.

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 across different learning 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.

The shift towards learning outcomes is integrated by a modular approach in order to increase the flexibility of VET paths, both from the point of view of labour market and from the point of view of learners. Modularisation can, for instance, support the creation of tailor-made curricula, that respond to specific skills needs.

To different extents, most of the EU countries have introduced module-based qualifications in their VET programmes (in Germany and Italy, for instance, modular structures are applied only to some qualifications, while countries like Poland and Spain have adopted a more convinced modular approach). A modular approach, combined with established paths for the recognition of informal and non-formal training, enhances the flexibility of VET programmes.

Transparency and cross-referencing are prerequisites for transferability of skills and geographical mobility. The ESCO database provides a relevant reference by offering a common understanding on skills, occupations and qualifications. 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 vocabularies and competences references at the European level and define useful proficiency benchmarks for companies, training providers, policy-makers, and learners.

An effectively implemented modular approach in all the European countries could be of great benefit for the steel industry, as it would allow for:

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) transnational modules with national and local requirements (opening to the possibility of a European certified repertoire of sectoral qualifications).

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