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SKILLING, UPSKILLING, RESKILLING
IN THE FUTURE AIR TRANSPORT

D3.1 VET training selection of methodologies for delivery

National quality assurance requirements for each country and guidelines for the design of training modules

(31/05/2021)

(Partner Responsible: ENAC)

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List of Acronyms

Acronyms List	
EQAVET	European Quality Assurance in Vocational Education and Training
CVET	Continuous Vocational Education and Training
IVET	Initial Vocational Education and Training
MCQ	Multiple Choice Questionnaire
SME	Subject Matter Experts
VET	Vocational Education and Training
XR	Extended Reality

Executive summary

The main purpose of this document is to present the results and conclusions of two tasks within the skill-UP project, namely:

- Task 3.1 - Review of national validation requirements for the five countries involved in the project
- Task 3.2 - Review existing methodologies used in education and training after collecting information both from partners who are training providers and from a literature review

The aim of Task 3.1 was to develop a quality standards guideline to follow through the curricula design, that follows not only the European Quality Assurance for Vocational Education and Training (EQAVET) Reference Framework, but also the special quality requirements in each partner country. To achieve this goal, T3.1 had three main steps:

The first step was to review and report the European Assurance Quality for Vocational Education and Training, since the Skill-UP training curricula and materials will be developed following the EQAVET quality standards (see Section 2). Thus, we can summarise the results as follows:

- Overview of EQAVET: Aim and Process of Creation.
- EQAVET Reference Framework: The concrete tool, that VET providers and systems should consider when developing their quality approach to VET.
- Importance of having an EQAVET Reference Framework.

The second step was to identify and analyse the national requirements for the validation of vocational training in each of the partners countries involved in the project: France, Italy, Malta, Portugal and Turkey (see Section 3). This aimed at understanding what or if there were national specific requirements which should be implemented in Skill-UP quality approach for VET. To validate each partner's analysis of the respective national quality system, the National Qualification Agencies were contacted (and will be further contacted to validate the final D3.1). The consultation and research revealed that: from the partner countries, four out of five are fully implementing the EQAVET Reference Framework to VET quality assurance, adapting it to national context and legislation. Turkey has not fully applied it yet, although an effort is being made as part of the process of joining the Europe Union.

France, Italy, Malta and Portugal are implementing the EQAVET Reference Framework. They all apply the original four-stage cycle and most of the indicative descriptors, with slight adaptations to their national context.

The national specific requirements for quality standards are applicable to systematic VET providers (e.g. Schools or Universities). In order to have a validated and certified vocational training, these entities must follow an extensive and expensive process, which requires full organizational commitment and an in-depth financial and human resources investment, together with liaison with national policy bodies/agencies. Even though the Skill-UP project does not aim to systematically deliver vocational training, these requirements should still be taken in consideration during training and assessment tools design and pilot implementation (T3.3; T3.4 and WP4). These outcomes would only be appropriate for use by VET trainers and teachers if national requirements are met.

Finally, the third step was to develop a quality guideline for Skill-UP training, considering both EQAVET general guidelines and the five countries' national quality requirements (see Section 4). The Skill-UP quality approach for training has at the core the Four-Stage Cycle of Quality (as EQAVET suggests) and the effectiveness of each stage can be assessed by a set of indicative descriptors (as a result of National Requirements and General European requirements analysis). A self-assessment tool was developed to facilitate Skill-UP trainers/researchers in the application of the process of quality assurance and assessment of each stage.

The aim of Task 3.2 was to review existing methodologies used in education and training. This task covered three objectives.

The first objective was to report current practices of training providers in VET and to synthetise their expertise in this field, in order to offer help and guidance for the design of training modules of the Skill-UP project (see Section 6). For several instructional methods, we reviewed their advantages, risks, points to watch and conditions of success. In particular, this review highlighted that:

- Eight categories of instructional methods were selected as being relevant for VET: lecture, case study, simulation, on-the-job-training, problem-based learning, role play, games-based training and team-training.
- Except from on-the-job-training, every instructional method may be delivered both online and face to face;
- With large groups, the best suited instructional methods are lecture, problem-based training or team-training;
- With small groups, case studies, simulation, role play or games-based training may be considered.

A second objective was to review scientific findings about the efficiency of various instructional methods (see Section 7). For this purpose, reference authors were consulted, and a book review was conducted. The results of these consultations were as follows:

- The teaching strategies with the greatest positive effects on increasing school-age students' knowledge over the course of a year are reciprocal teaching, cooperative learning, peer tutoring, the provision of elaborated content (feedback, metacognitive strategies, problem solving), the use of worked examples, the construction of concept maps and the presentation of interactive videos (Hattie, 2009).
- The most effective features on learning in games are the presentation of words in oral form, the use of a conversational style, as well as the possibility of providing pre-game experience, advice and prompts to explain (Mayer, 2014, 2019).
- There is an advantage to using extended reality over traditional learning techniques for training situations involving significant danger or cost (Kaplan et al., 2020).
- In Europe, VET is organised in very heterogeneous systems. However, they are based on competence models dominated by practice-based teaching and assessment of knowledge (Ellaway, 2007).
- These different approaches make cross-sectional evaluations and comparisons of different courses difficult (Winterton, 2012).
- Vocational training courses share dependence on regulations, accreditation, expert trainers and practical training venues (professional context).
- The common learning activities are oriented towards learning by doing and socio-constructivism, aiming to lead the learner to acquire and maintain professional expertise. Some of the most common activities are discussed in the report (problem-based learning, internship, portfolio, case study, programmed instruction, role play, formative evaluation).

The third objective was to list important considerations for the design of training modules, pointed out by influential researchers in the field (see Section 8). Thus, we can summarise the results as follows:

- Regardless of the choice of instructional method and before starting the design of a module, training designers should list the learning objectives of the training module and determine the types of knowledge that trainees should acquire, related to these objectives.
- It is possible to classify learning objectives by type of cognitive process (remember, understand, apply, analyse, evaluate, create) according to Bloom's taxonomy, revised by Anderson and Krathwohl (2001), and to use the categories of knowledge (factual, conceptual, procedural, metacognitive) according to these same authors.
- To design a training module, an important instructional design model for complex learning is the "ten stages of complex learning" (Van Merriënboer & Kirschner, 2017) based on four main components which are the design of: learning tasks (integrating skills, knowledge and attitudes and sequenced from simple to complex), of supportive information (for non-recurrent task aspects), of procedural information (for recurrent task aspects) and of part-task practice (for selected recurrent task aspects).
- Several common ideas in education are wrong, need to be nuanced or are unproven. Eight of these, called “myths”, relevant to vocational education, are presented (De Bruyckere, Kirschner & Hulshof, 2015).
- Five important principles should be followed by instructional designers (Merrill, 2013): focus on the problem in a real context, promote activation of existing knowledge, carry out demonstration, have learners apply the skill, and allow integration of the skill through reflective methods and discussion.

Task 3.1 (quality standards guide) associated with task 3.2 (methodologies used in education and training) constitute deliverable 3.1 of the SkillUp project. The information provided in this

deliverable aims at proposing to the project partners concrete and argued elements to design training modules (T3.3) and their implementation (T3.4) in the respect of quality standards in VET for each of the countries concerned.

1 Introduction

1.1 Objectives

The main objective of this deliverable is to report results from two tasks of Work Package 3, namely:

- Task 3.1: review of national validation requirements for the five countries involved in the project
- Task 3.2: existing methodologies used in education and training after collecting information both from partners who are training providers and from a literature review

Focusing on T3.1 the first objective is to present and review the European Quality Assurance in Vocational Education and Training (EQAVET), in order to understand the general guidelines that are the basis to each country's specific approach. Secondly, the goal is to present the EQAVET application in each country both for Initial Vocational Education and Training (IVET) and Continuous Vocational Educational and Training (CVET). Finally, the goal is to compile the requirements in each country in order to produce a quality guideline for the development of the Skill-UP training in Task 3.3.

More specifically, the first objective of Task 3.2 is to report current practices of training providers in VET and to synthetize their expertise in this field in order to offer help and guidance for the design of training modules. The second objective is to synthetize scientific findings about the efficiency of various instructional methods. Finally, the third objective is to list important considerations for the design of training modules, pointed by influential researchers in the field.

1.2 Definitions

Instruction is a deliberate attempt to structure a learning environment so that students will acquire specified knowledge or skill (Merrill, 2012, p.6)

Following several researchers in instructional design (e.g., Mayer & Alexander, 2016; Merrill, 2012; van Merrienboër & Kirschner, 2017) we use the term "**instructional method**" to refer to all the strategies, methods and tools that can be used by trainers to help learners acquire knowledge or skill.

2 European Quality Assurance in Vocational Education and Training

The European Quality Assurance in Vocational Education and Training (EQAVET) is a community of practice that brings together the EU Member States, the Social Partners and the European Commission to develop and improve quality assurance in European VET systems within the context of implementation of the European Quality Assurance Reference Framework.

Taking in consideration the European strategic priorities, needs and goals, the current EQAVET Work Programme (2018-2019) defines that the EQAVET mission is to develop, disseminate and promote best European practice in the field of quality assurance in VET at system and provider levels by supporting the implementation of the EQAVET Recommendation and fostering sustainable and inclusive activities – task-oriented cooperation among stakeholders at different levels (EQAVET, 2019).

2.1 European Quality Assurance Reference Framework

2.1.1 Overview

The Reference Framework is one of the initiatives developed by Member States in cooperation with the European Commission, and it is in line with the Copenhagen Declaration and the ongoing effort to renew Europe's education and training systems.

The Reference Framework aims to:

- Recognise qualifications and competences received by learners across different countries or learning environments, thereby promoting modernisation, mutual trust and mobility in vocational education and training (VET).
- Promote better VET by providing authorities with common tools for quality management.

Moreover, the Reference Framework complements the work on the quality assurance aspects of the European Qualifications Framework (EQF) and the European Credit System for VET (ECVET). It builds on earlier European level work on quality assurance systems (such as the Common Quality Assurance Framework – CQAF and European Network for Quality Assurance in VET – ENQA-VET).

2.1.2 The Reference Framework as a Tool

In practice, the European Quality Assurance Reference Framework for VET is an instrument for improving the quality of VET, that provides a European-wide system to help Member States and stakeholders to document, develop, monitor, evaluate and improve the effectiveness of their VET provision and quality management practices.

The Reference Framework can be applied at both system and VET provider levels and can therefore be used to assess the efficiency of VET provision. It is adaptable to the different national systems and it can be used in accordance with national legislation and practice.

The Reference Framework has as its basis a four-stage quality assurance cycle, as shown in *Figure 1*, and which consists of:

1) Planning: Setting up clear, appropriate and measurable goals for all the aspects of the VET;

2) Implementation: The procedures to ensure the achievement of goals and objectives, which for example can be the establishment of a stakeholders' network;

3) Evaluation: Of the VET provision itself, but also the assessment of the outcomes for both system and individuals;

4) Review: The application of the feedback and implementation of the changes to improve the procedures.

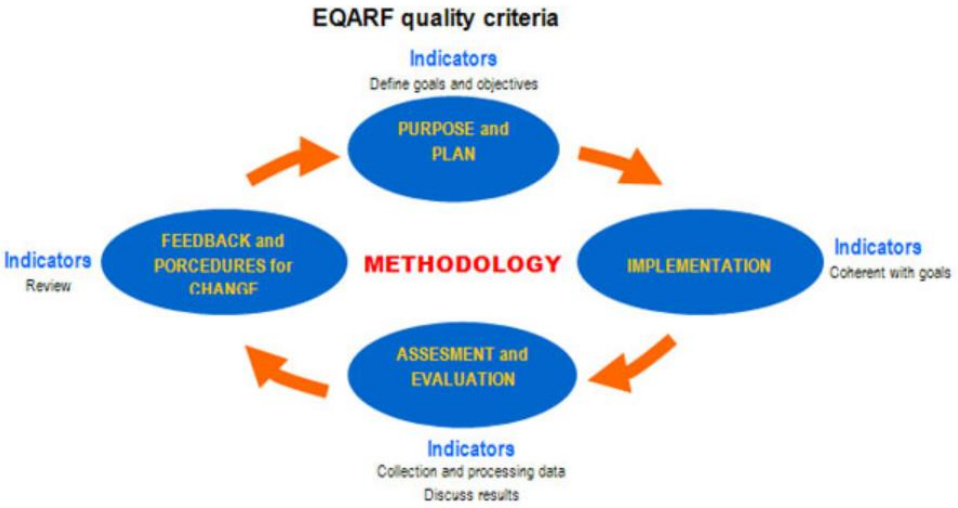

Figure 1. The Four Stages Cycle of European Quality Asurrance Refernce Framework.

Each Stage has a set of indicative descriptors intended to assist VET providers or systems in considering their quality assurance approach and improve it. Each descriptor has two constraining statements to invite the person to consider which statement best describes their own approach. The indicative descriptors are an important element of the Reference Framework since they allow the revision of the progress towards a European system of quality assurance.

Finally, the Cycle of quality is accompanied by a set of 10 indicators which may be used as a "toolbox" by countries as they work on adapting and developing their VET systems. The indicators are not designed for benchmarking, but rather to support a culture of quality assurance in VET, and are:

- Relevance of quality assurance systems for VET providers.
- Investment in training of teachers and trainers.
- Participation rate in VET programme.
- Completion rate in VET programme.
- Utilisation of acquired skills at the workplace.
- Unemployment rate.
- Prevalence of vulnerable groups.
- Mechanisms to identify training needs in the labour market.
- Schemes used to promote better access to VET.

2.1.3 Importance of having a Reference Framework

The European Quality Assurance Reference Framework for VET allows:

1) To increase transparency and mobility: By establishing a shared understanding among Member States of what constitutes quality, the Reference Framework increases portability and recognition of qualifications and competencies received by learners across European countries.
2) To valorise permeability in a lifelong learning perspective: The Reference Framework focuses on the improvement and evaluation of the outputs and outcomes of VET - in terms of three EU policy priories: increasing employability, improving the match between supply and demand for training, and promoting better access to lifelong training (especially for vulnerable groups).
3) To make VET more attractive: By ensuring mutual recognition, thereby fostering international, national and sectoral mobility, VET providers can enrich training provision, raise the attractiveness of training programmes and enhance their pan-European reputation. The Framework, because it is based on outcomes of VET, facilitates cooperation between VET providers and companies. This means that VET providers can strengthen the link between education and training and the labour market.

2.2 Build your Quality Assurance System for VET Providers

The 2009 Recommendation on the establishment of a European Quality Assurance Reference Framework for VET recommends that the four stages of the quality cycle, the indicative descriptors and the indicators are used to improve and develop VET provision.

Additionally, for VET providers at the initial stages of development of their quality assurance approach, the EQAVET also includes a set of six guidelines named "Building Blocks" Each guideline contains a "call to action" that helps National Reference Points to support VET providers to develop a quality assurance approach in line with the EQAVET recommendation.

2.2.1 The Building Blocks

The Building Blocks result from the effort of the EQVAET Working Groups, that recognise that National Reference Points could encourage VET providers to use one or more of six Building Blocks to develop their approach to quality assurance. The Building Blocks are mainly targeting the VET providers that are still developing their quality approach. However, they can still be useful to VET providers with existing and established quality assurance systems, as a checklist to support further improvement. Finally, the Building Blocks can be used by all VET providers including those that

offer apprenticeships, company-based training, continuing and initial training. The six Building Blocks are:

1) Ensure there is a management culture which is committed to quality assurance: Answer the questions: Does the management team value quality assurance? Are all managers involved in ensuring high quality VET? Does the management team take responsibility for quality assurance?
2) Develop approaches which reflect the provider's circumstances: Answer the questions: How can VET providers use the EQAVET Recommendations to improve their approach to quality assurance?
3) Develop a culture of self-assessment: Answer the questions: Are those involved in VET participating in self-assessment? Does the management team support self-assessment?
4) Support staff training in relation to quality assurance: VET quality depends on the knowledge and skills of their staff, and its quality can be improved by increasing awareness of quality assurance.
5) Use data and feedback to improve VET: Answer the questions: Is data and feedback analysed and used to improve VET provision? Do the EQAVET indicators and indicative descriptors help to identify areas of development? Only by collection of data and analysis of the performance of learners, VET can be properly modified and improved.
6) Ensure VET is based on the involvement of external and internal stakeholders: Answer the questions: Is the quality of provision improving as a result of stakeholder's feedback? How are the internal and external views taken into account? Is there a systematic approach to collecting and meeting the needs of stakeholders?

Bulding Blocks relationship with Four Stages Quality Assurance Cycle				
Building Blocks	**Planning**	**Implementation**	**Evaluation**	**Revision**
1)Ensure there is a management culture which is committed to quality assurance	x	x	x	x
2)Develop approaches which reflect the provider's circumstances	x	x		
3)Develop a culture of self-assessment			x	x
4)Support staff training in relation to quality assurance	x	x		x
5)Use data and feedback to improve VET			x	x
6)Ensure VET is based on the involvement of external and internal stakeholders	x	x	x	

Table 1. Relationship between the Building Blocks guidelines and the Four Stages of the Quality Assurance Cycle.

2.2.2 The Quality Assurance Cycle

As previously mentioned, the four-stage quality assurance cycle, in accordance with other quality assurance models, includes four stages. To develop each stage, it is necessary to consider:

- The 10 indicators;
- The Building Blocks for VET providers;
- The set of indicative descriptors, each stage has a set of specific indicative descriptors to assess the stage's effectiveness and further improve.

2.2.2.1 Planning

To develop the Implementation stage, the VET provider must consider:

- The indicative descriptors;
- The examples from other Member States, available on the EQAVET platform;
- How to best take views from all the stakeholders, including staff;
- Design an effective communication strategy.

In order to continuously assess and improve the Planning stage, the VET providers must consider the eight indicative descriptors by selecting which statement is more adequate to their current approach:

EQAVET Indicative descriptor	Would the VET provider describe their approach as one where it is more likely that...		Would the VET provider describe their approach as one where it is more likely that...	
European, national and regional VET policy goals/objectives are reflected in the local targets set by the VET providers	...VET provision takes account of European, national and regional goals or objectives		... the goals and objectives of the VET provider are not connected to the European, national and regional VET policy	
Explicit goals/objectives and targets are set and monitored	...there is clarity in relation to how goals or objectives are set and monitored		...it is not clear how the organisation's objectives or goals are set and monitored	
Ongoing consultation with relevant stakeholders takes place to identify specific local/ individual needs	...VET provision is based on local / individual needs following consultation with stakeholders		...little consultation takes place to identify the needs or priorities of stakeholders	
Responsibilities in quality management and development have been explicitly allocated	... responsibility for each aspect of quality management and development is clear		...there is little clarity over who has responsibility for quality management and development	
There is an early involvement of staff in planning, including with regard to quality development	...staff are involved early in planning all aspects of provision.		...staff are informed of planning decisions	
Providers plan cooperative initiatives with other VET providers	...VET providers work with other VET providers to plan their activities		... VET providers do not plan cooperative activities	
The relevant stakeholders participate in the process of analysing local needs	...the voice of stakeholders is very important in identifying what VET is needed		...stakeholders are informed about what VET provision is available	
VET providers have an explicit and transparent quality assurance system in place	...all stakeholders know and understand the VET provider's quality assurance system		... few individuals are aware of the VET provider's quality assurance system	

Figure 2. The Indicative Descriptors assessment table for the Stage One: Planning of the Quality Assurance Cycle.

2.2.2.2 Implementation

To develop the Implementation stage, the VET provider must consider:

- The indicative descriptors;
- The examples from other Member States, available on the EQAVET platform;
- How to best take views of all the stakeholder, including staff;
- Design an effective communication strategy.

In order to assess and improve continuously the Implementation stage, the VET providers must consider the four indicative descriptors by selecting which statement is more adequate to their current approach:

Indicative descriptor	Would the VET provider describe their approach as one where it is more likely that...		Would the VET provider describe their approach as one where it is more likely that...	
Resources are appropriately internally aligned/assigned with a view to achieving the targets set in the implementation plans	... staff and other resources are assigned effectively	√	...resources are not assigned in line with the VET provider's targets as set out in an implementation plan	
Relevant and inclusive partnerships are explicitly supported to implement the actions planned	...collaboration is strong and supports the implementation plan		...there is little support for partnership working	
The strategic plan for staff competence development specifies the need for training for teachers and trainers	...it is clear what development will be available for teachers and trainers		...training is not linked to the development of staff competence	
Staff undertake regular training and develop cooperation with relevant external stakeholders to support capacity building and quality improvement, and to enhance performance	...staff receive regular training and work with external stakeholders to develop their practice and enhance performance		...staff training is ad hoc and staff tend to be isolated from external stakeholders	

Figure 3. The Indicative Descriptors assessment table for the Stage Two: Implementation of the Quality Assurance Cycle.

2.2.2.3 Evaluation

To develop the Evaluation stage the VET provider must consider:

- The indicative descriptors;
- The examples from other Member States, available on the EQAVET platform;
- Evaluation needs;
- How to collect data in a systematic and predictable way in order to provide clear outcomes for all stakeholders.

In order to assess and continuously improve the Evaluation stage, the VET providers must consider the four indicative descriptors by selecting which statement is more adequate to their current approach:

Indicative descriptor	Would the VET provider describe their approach as one where it is more likely that...		Would the VET provider describe their approach as one where it is more likely that...	
Self-assessment/self-evaluation is periodically carried out under national and regional regulations/frameworks or at the initiative of VET providers	... periodic evaluation uses an agreed framework and identifies where improvements can be made		...self-evaluation is rare	
Evaluation and review covers processes and results/outcomes of education including the assessment of learner satisfaction as well as staff performance and satisfaction	...evaluation and review takes account of a full range of views including learners' satisfaction and staff performance		...evaluation and review only considers a limited range of views and processes	
Evaluation and review includes adequate and effective mechanisms to involve internal and external stakeholders	...the views of internal and external stakeholders are reflected		...the evaluation and review focuses mainly on the VET provider's perspective	
Early warning systems are implemented	...the VET provider has systems in place to predict problems or issues		...the VET provider does not identify problems or issues at an early stage	

Figure 4. The Indicative Descriptors assessment table for the Phase Three: Evaluation of the Quality Assurance Cycle.

2.2.2.4 Review

To develop the Review stage the VET provider must consider:

- The indicative descriptors;
- The examples from other Member States, available on the EQAVET platform;
- How to best introduce changes following the Review;
- and the value of publishing information on performance.

In order to assess and continuously improve the Review stage, the VET providers must consider the four indicative descriptors by selecting which statement is more adequate to their current approach:

Indicative descriptor	Would the VET provider describe their approach as one where it is more likely that...	Would the VET provider describe their approach as one where it is more likely that...
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	...full account is taken of learners' and teachers' feedback in the review of practice	...any review is less likely to take account of learners' and teachers' feedback
Information on the outcomes of the review is widely and publicly available	...outcomes of any review are in the public domain	...review outcomes are unlikely to be in the public domain
Procedures on feedback and review are part of a strategic learning process in the organisation	...reviews are planned and inform the regular updating of practice	...the outcomes of a review are unlikely to change practice
Results/outcomes of the evaluation process are discussed with relevant stakeholders and appropriate action plans are put in place	...the outcomes of the reviews are shared widely in order to appropriate action plans to be put in place	...reviews are usually only considered by the management team

Figure 5. The Indicative Descriptors assessment table for the Phase Four: Review of the Quality Assurance Cycle.

3 National Application of the EQAVET Framework

In 2009, the European Quality Assurance Reference Framework for VET was established, recommending VET providers and systems to use the quality cycle, the indicative descriptors and indicators to improve and develop VET provision. Member States were invited to devise an approach based on the EQAVET quality system at national level no later than 18 June 2011.

The 2009 Recommendation also included the establishment of a Quality Assurance National Reference Point which should:

- provide active support for the implementation of the EQAVET Framework;
- take steps to further develop the quality assurance system in a national context;
- support self-evaluation;
- disseminate information to stakeholders.

Taking this in consideration, in this section, the Skill-UP project will analyse the national application of the EQAVET Reference Framework for each partner country of the Skill-UP project, which include: France, Italy, Malta, Portugal and Turkey.

3.1 The template

In order to collect systematic data about each national approach to EQAVET and/or VET Quality, each partner country filled in a template to explore their national VET system, especially the quality process of VET. With that purpose, the template (Figure 6) included:

- Overview of the IVET and CVET in their own country;
- Overview of VET national quality system;
- National requirements for the Four-Stage Quality Assurance Cycle, which included the revision of each stage in detail;
- Validation and Accreditation requirements;

- National Entities related/responsible for EQAVET or Quality Assurance.

REQUIREMENTS	VET TRAINING (please add another column if IVET and CVET have different requirements)
GENERAL OVERVIEW	
1st STAGE: PLANNING	
2nd STAGE: IMPLEMENTATION/MONITORING	
3rd STAGE: EVALUATION	
4th STAGE: REVISION	
VALIDATION & ACREDITATION	
NATIONAL ENTITIES RESPONSIBLE	

Figure 6. The Template for data collection about National Quality Requirements

In order to ensure the accuracy of the information, some partners validated the template content with their National Qualifications Agency, through an online meeting (due to COVID-19 pandemic). However, it was not possible to contact all the National Agencies. Section 1 (T3.1) will be shared with National Qualifications Agency in order to ensure effectiveness and relevance of the analysis conducted and guidelines developed.

3.2 Partner Country Quality Requirements for VET

3.2.1 France

3.2.1.1 Initial Vocational Education and Training (IVET) System: Overview

The French education system is characterised by a strong central State presence in the organisation and funding of Education. The French education system is regulated by the Department for National Education, Higher Education and Research. It governs within the framework defined by the Parliament, which states the fundamental principles of education. The State plays a major role in governance, as, by long tradition, the French education system is centralised. The State defines the details of curricula at all education levels; it organises the teachers' qualification procedure, defines content, recruits teachers who become civil servants, provides them with in-service training; it recruits and trains inspectors, responsible for controlling the quality of the education system; it is the main funding body of the public education system and subsidises "private schools under contract" which receive approximately 20% of school pupils.

Nevertheless, at local level, and since the start of a process of decentralisation of competences in the administration of the educational system in the 1980s, local authorities have been playing an increasing part in governance, ensuring the material operation of the system (construction and maintenance of school buildings, school transport, supply of educational materials, etc.).

The official language for education is French. Public education is secular and free.

France has a long tradition of pre-primary education: for the past twenty years, almost all children have attended *école maternelle* (nursery school) from three to six, even though it is optional; it is therefore an integral part of the French education system and falls under the responsibility of the Department for National Education, Higher Education and Research, which sets the curricula.

French pupils are taught the same subjects until the age of 15 within a "collège unique". The first stage of specialisation occurs at the end of *collège* (lower secondary education): pupils are streamed to attend either a general, technological or vocational lycée. All prepare pupils to take the *baccalauréat* in three years, marking the end of secondary education: pupils who pass it obtain the State-issued *baccalauréat* diploma (general, technological or vocational) which opens access to higher education and entitles them to enrol at university.

Higher education is characterised by the coexistence of two systems: universities, – public institutions that have an open admissions policy, except for *Instituts Universitaires de Technologie* (IUT - University institutes of technology) or some *classes préparatoires intégrées* (integrated preparatory classes) – and a non-university sector, including, in particular, *Grandes Écoles* (Elite Schools), with a highly selective admissions policy open to *baccalauréat* holders having attended two years of *classes préparatoires*, themselves highly selective on entry and during the course. Post-secondary non-tertiary education is marginal in France: the only two diplomas of ISCED 4 that the French education system provides amounted to less than 10,000 graduates in 2014.

Higher education institutions evaluated by the CCESP, the CTI and the *Hcéres* benefit from a derogatory regime and are deemed to meet the obligation of quality certification provided for by the

law of 5 September 2018. They can therefore benefit from funding for the implementation of continuing education and apprenticeship training, without however being able to benefit from the QUALIOPI label.

Apprenticeship is based on the principle of alternating between theoretical and practical training in CFAs (apprentice training centres) and with the employer with whom the apprentice has signed a contract.

France Compétences plays a role as a funder and regulator by: determining the levels of funding for apprenticeship contracts; funding the Regions to support the CFAs and territorial economic development; funding the OPCOs (Competence operators) to promote work-linked training.

3.2.1.2 Continuous Vocational Education and Training (CVET) System: Overview

Anyone who has been out of the initial training system for more than a year, and who wishes to return to education, comes under the vocational training or continuing education regime.

The latest major development in the field of vocational training dates from Law No. 2018-771 of 5th September 2018 on the freedom to choose one's professional future. In the field of adult training, this law reformed the Personal Training Account (CPF), which lists the rights acquired by employees throughout their working lives and until retirement, as well as the training they can benefit from. The law also created France Compétences, which is responsible for organising, leading and regulating the vocational training sector.

Since the law No. 1971-575 of 16th July 1971, continuing training for adults has become an open market in which various organisations operate. This means that there are many training bodies coexisting on the market: companies, public and private institutions, non-profit associations. These organisations may have training as their main or secondary activity. Most of the organisations providing continuing education are small. It is in the public and semi-public sector that we find the most significant actors in terms of size: the AFPA, but also the CAFOC and GRETA network, which represent respectively 12% and 11% of the continuing training market.

Public organisations provide an average 20% of training in France. Private organisations' clients are mainly companies and their employees, from the private sector, as well as jobseekers.

The French State remains the guarantor of the proper use of public funds and mutualised funds dedicated to vocational training and apprenticeship.

France Compétences, a national public institution, is the only national governance body. Its missions are to finance, regulate and improve the vocational training and apprenticeship sector. France Compétences establishes and updates the two national directories: the RNCP (the National Directory of Professional Certifications) and the RS (the specific directory). The RNCP collects diplomas, titles and professional certifications by level, they are composed of blocks of competences and with permanent validity. The RS, meanwhile, collects complementary certifications and accreditations, without level or block of competences and generally with a limited validity in time. France Compétences has a professional certification Department and a Professional Certification Commission which work to guarantee the relevance of qualifications and their adequacy with the needs of the economy.

The competence-based approach and the principle of lifelong learning are paramount and emphasise the notion of a career path. The CEP (Professional development advice) is a free, universal and personalised right that allows any person to take stock of their professional situation. The skill assessment enables the analysis of professional and personal skills. The advice centres for the validation of acquired experience provide guidance on projects for the Validation of Acquired Experience (VAE).

The personal training account (CPF) is a public funding system for continuing education, there are other funders such as Pole Emploi, the state, the regions, the professional branches and the OPCOs.

The quality of training organisations must be assessed by a QUALIOPI certifying body in order to benefit from public funds such as the CPF.

3.2.1.3 Quality Assurance System and Requirements

France Quality Requirements	
GENERAL OVERVIEW	France Compétences received in 2019 missions and delegations from different countries and training systems. As part of its mission for the European reference framework for quality assurance, France compétences has endeavoured to present itself, through various actions, to the entire network of actors involved (European Center for the Development of Vocational Training (Cedefop) - European Quality Assurance in Vocational Education and Training (Eqavet) - Renewed European Agenda for Adult Education and Training (AEEFA), etc.). CERAQ serves to help Member States improve the quality of their vocational education and training systems and to increase transparency of policy developments between Member States in this area. Each member state designates a national reference point for the application of the Recommendation, and it is France compétences which has been designated as the national reference point. Other French institutional representatives in the CERAQ network are the Ministry of Labour and the Ministry of National Education. The French mandatory education system is divided into three stages, the primary education (for ages 6-11), lower secondary education (for ages 12-15) and the upper secondary education in either a General and technological "Lycée" or in a vocational "Lycée" (mandatory for ages 15 and 16). On completion of their schooling, pupils are awarded a brevet (national certificate) on the basis of their grades over the final two years (fourth and third classes) and a national examination. The brevet is not a mandatory qualification and continuation of their schooling in a lycée is not dependent on their passing the examination, but on having successfully completed the third year. In order to enter the last stage of mandatory education, the Lycée, the pupils are offered three options, general studies, technological studies and vocational training. The general and technological lycées provide the preparation for three types of general baccalaureates (economic and social, literary or scientific), a technological baccalaureate (with eight categories) or a vocational training certificate (brevet de technicien). Upon completion of the vocational “lycée”, the vocational training certificate allows students to enter working life, or to continue their studies in higher education vocational sections or in an “Institut Universitaire Technologique”. The “lycée professionnel” provides a combination of general education and technical knowledge, including a guaranteed in-company placement. It prepares students over a two-year period for the first level of vocational qualification, corresponding to the “certificat d’aptitude professionnelle” (CAP) or the “brevet d’études professionnelles” (BEP). Both qualifications are similar, but while the CAP has a greater focus on vocational training, the BEP is more focused on general education, intended for those wanting to continue their studies. At the end of their initial vocational training, students may follow a two year program in order to obtain a vocational baccalaureate, leading to direct employment or to further study. The Ministry of Education is responsible for education policy as pursued through vocational training in schools and through apprenticeships. The Ministry of Agriculture and Fisheries has a parallel responsibility for vocational training in agriculture. The Ministry of the Economy, Industry and Employment is in charge of continuing vocational training for young people and adult job-seekers and for the vocational training of employees in the private sector (it can thus make rules and regulations and set training fees, etc.). Other ministries, such as the Ministry of Youth and Sport, are in charge of training and vocational diplomas in the areas for which they are responsible. In 2004 the National Council for Lifelong Vocational Training (Conseil national de la formation professionnelle tout au long de la vie or CNFPTLV) was set up. Its tasks are to: • Promote cooperation at national level among the various agencies involved; • Advise regulations concerning lifelong vocational training and apprenticeship; • Assess regional policies for apprenticeship and continuing vocational training;

	• Compile an annual report to Parliament on the utilization of financial resources earmarked for lifelong vocational training and apprenticeship. With a view to coordinating vocational training policies and measures, regional employment and vocational training coordination committees (Comités régionaux de l'emploi et de la formation professionnelle or CCREFPs) have been established. These committees – made up of regional representatives of the Government as well as representatives of the regions, trade unions and employers' organizations, and regional chambers of agriculture, commerce, industry and trades – are tasked with promoting cooperation among the different agencies involved in vocational training. They ensure better coordination of vocational training and employment policies at national level. Specifically, their functions include policy analysis, research, monitoring and evaluation. **IVET** School attendance in France is mandatory between ages 6 and 16 and the French education system consists of three educational cycles: • Observation and preparation to secondary level during the first year; • Two core years; • Education/training observation. IVET at lower secondary schooling (college) lasts four years, covering school years 6 to 9. Education is organised into three educational phases. At upper secondary level, once students leave the college at age 15 (unless they repeated a year), they either attend a "lycée d'enseignement général et technologique" -LEGT-[General education and technological high school], or a "lycée professionnel" -LP [Vocational high school]. At this stage, pupils spend three years working for a general or technical diploma, or in a vocational high school, providing the CAP or BEP, or over three years for a secondary vocational diploma, the "Bac Pro". Vocational courses combine general education with a high level of specialized technical knowledge, aiming to prepare students for a trade and to pursue further studies. They also lead to the delivery of national diplomas and include mandatory periods of workplace training, between 3 and 10 weeks every year, depending on the diploma. Students can also switch between learning routes and systems, being able to move from general and technical education or from vocational training into technical studies. **CVET** The French CVET system was introduced in the 1970s, involving the French state, regions, companies and social partners. It has its own distinct structure, in which collective negociation plays an important role and people can access training in different ways, depending on their individual status: job seekers, employees, and their age, under 26, 26-45 and over 45. Continuing vocational training is intended for people, both young and old, who are already part of the workforce or are embarking on working life. It aims to help them find or return to work, to remain in employment, to develop their skills and acquire different levels of vocational qualification, to enhance their earning power and to improve their cultural and social circumstances. The social partners and the State have developed and implemented various schemes which fall into two categories: training for job-seekers and training for people who have a job (employees in the private and public sectors and self-employed people). Since 2008, the Government implemented a process of reforming vocational training for private-sector employees and job-seekers. It reviewed various aspects of the system, focusing on certain core aims: to give individuals more secure career prospects, enabling them to find or return to work quickly; to overhaul the financing of training for people in work (reducing the number of bodies collecting contributions – see Chapter 10); to introduce a training 'savings account' based on the now-transferable individual entitlement to training (known as the DIF). Since 2018 France Compétences is one of the main organisations responsible for ensuring the quality of the training and apprenticeship system. The law of the 5th September 2018 sets out the new national quality standard aimed to provide more harmonisation and transparency. This is a new basis for all VET providers. France compétences has been appointed as a national reference point for EQAVET.

1st STAGE: PLANNING	**Quality Criteria** Planning reflects a strategic vision shared by the relevant stake holders and includes specific goals/objectives, actions and indicators. **Indicative descriptors at VET-system level** Aims/objectives of VET are described for the medium and long term and linked to European and Sustainable Development Goals taking into account environmental sustainability considerations. Social partners and all other 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 the training needs of the labour market and society. 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. VET qualifications are described using learning outcomes. Mechanisms are established for the quality assurance of the design, assessment and review of qualifications. VET programmes are designed to allow flexible learning pathways and to respond quickly to changing labour market needs
2nd STAGE: IMPLEMENTATION	**Quality Criteria** Implementation plans are devised in consultation with stakeholders and include explicit principles. **Indicative descriptors at VET-system level** Implementation plans are established in cooperation with social partners, VET providers and other relevant stakeholders at the different levels. Implementation plans include consideration of the resources required, the capacity of the users and the tools and guidelines needed for support. Guidelines and standards have been devised for implementation at different levels. These guidelines and standards include assessment, validation and certification of qualifications. Implementation plans include specific support towards the training of teachers and trainers, including for digital skills and environmental sustainability. VET providers' responsibilities in the implementation process are explicitly described and made transparent. A national and/or regional quality assurance framework has been devised and includes guidelines and quality standards at VET-provider level to promote continuous improvement and self-regulation.
3rd STAGE: EVALUATION	**Quality Criteria** Evaluation of outcomes and processes is regularly carried out and supported by measurement. **Indicative descriptors at VET-system level** A methodology for evaluation has been devised, covering internal and external evaluation. Stakeholder involvement in the monitoring and evaluation process is agreed and clearly described.

	The national/regional standards and processes for improving and assuring quality are relevant and proportionate to the needs of the sector. Systems are subject to self-evaluation, internal and external review, as appropriate. 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.
4th STAGE: REVIEW	**Indicative descriptors at VET-system level** Procedures, mechanisms and instruments for undertaking reviews are defined and used to improve the quality of provision at all levels. Processes are regularly reviewed and action plans for change devised. Systems are adjusted accordingly. Information on the outcomes of evaluation is made publicly available.
VALIDATION & ACREDITATION	The French QUALIOPI quality standard takes the EQAVET indicators and breaks them down into 7 criteria and 32 quality indicators. An external audit allows to verify that the VET providers respect the criteria, this audit is carried out by an independent approved body. The procedure is long and requires a strong commitment from the VET providers and has a financial cost.
NATIONAL ENTITIES RESPONSIBLE	France Compétences (the National Directory of Professional Certifications and the specific directory) COFRAC (The French accreditation committee) OPCOs (Competence operators) CERAQ (European Quality Assurance Reference Framework for Vocational Education and Training) The DIRECCTE and DREETS The CAFOC (Academic Centre for Continuing Education) The Ministry of Education The Ministry of Higher Education and Research CTI (Engineering Degree Commission) Hcéres (French Office for Research Integrity) The Ministry of Labour, Employment and Economic Inclusion Pôle Emploi (public employment service, advice for jobseekers) Professional branches and branch observatories
SOURCES CONSULTED	EQAVET. Implementing the framework – France. https://www.eqavet.eu/what-we-do/implementing-the-framework/france Eurydice – European Comission. (2021). Adult Education and Training. https://eacea.ec.europa.eu/national-policies/eurydice/france/adult-education-and-training_en Eurydice – European Commission. (2021). France Overview. https://eacea.ec.europa.eu/national-policies/eurydice/content/france_en Ministère de l'Education Nationale. (2010). l'Education nationale et la formation professionnelle en France. https://media.eduscol.education.fr/file/dossiers/61/5/formation_professionnelle_VF_151615.pdf The Council of the European Union. (2020). Official Journal of the European Union.https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020H1202%2801%29 Ministère du Travail, de l'Emploi et de l'Insertion. (2021). Qualité de la formation : les fondamentaux. https://travail-emploi.gouv.fr/formation-professionnelle/acteurs-cadre-

	et-qualite-de-la-formation-professionnelle/article/qualite-de-la-formation-les-fondamentaux

Table 2. France Quality Requirements

3.2.2 Italy

3.2.2.1 Initial Vocational Education and Training (IVET) System: Overview

In Italy all young people have the 'right/duty' (Law 53/2003, p. 7) to pursue their education and training for at least 12 years before reaching age 18.

The aim is that young people should not leave education and training without a qualification. However, compulsory education lasts 10 years, up to 16, and includes the first two years of upper secondary general education or VET.

Young people finish lower secondary education at age 14. At this stage, learners sit a state exam to acquire a certificate (EQF level 1) which grants admission to the upper secondary level where young people have the opportunity to choose between general education or VET.

At upper secondary level, young people may opt for:

1)five-year programmes which include the two last years of compulsory education and three years (under the right/duty of education and training) in:

- high schools (licei). These provide general education programmes at upper secondary level;
- technical schools;
- vocational schools.

High schools (licei) offer artistic, classical, linguistic, scientific, human sciences, music and dance strands. Within the artistic strand, learners can specialise in figurative arts, architecture and environment, design, audiovisual and multimedia, graphics or stage design in the second period.

The qualifications awarded after successful completion of high school, technical and vocational school are at EQF level 4 and a state leaving exam at the end of them gives access to higher education;

2) vocational education and training programmes organised by the regions (IeFP – Istruzione e Formazione Professionale);

3) an apprenticeship-type scheme (after age 15).

3.2.2.2 Continuous Vocational Education and Training (CVET) System: Overview

At post-secondary level, the Italian system features higher technical training (IFTS – Istruzione e Formazione Tecnica Superiore or ITS – Istituti Tecnici Superiori) and short programmes or courses (post-IeFP and others). VET courses also exist at post-higher education level.

Tertiary education (ISCED levels 665, 667, 766, 767, 768, 864) is divided into higher education programmes at the university and higher education programmes at non-university institutions:

1. universities: can be public or private and follow the three cycles of the Bologna structure: bachelor (laurea); master (laurea specialistica/magistrale); and specialisation or PhD programmes (masters universitario di secondo livello, dottore di ricerca);
2. higher artistic and musical programmes (alta formazione artistica e musicale) which are non-university programmes based on the three-cycle structure.

Italian VET provision also offers opportunities in adult education and CVT.

The legislative framework related to the CVET is the following:

- Ministerial Decree (Ministry of Labour) 30/06/2015, Definition of an operational framework for the national recognition of regional qualifications and related skills, within the National Directory of Education and Training Qualifications and Professional Qualifications referred to in Article 8 of Legislative Decree 16 January 2013, n. 13;

- Legislative Decree no. 13/2013, General dispositions and expected minimum levels of performance for identification and validation of non-formal and informal learning as well as of minimum service standards of the national system for skills certification, as foreseen by law 28 June 2012, no. 92 (National system of the certification of the skills)

- Law no. 92/2012, The Reform of Italian Employment Law (artt. 51-68). Rif. Legge Fornero (it foresees territorial networks for lifelong learning)

- Law 53/2005 recognizes in some way the right of the worker to permanent training. To allow this type of training, art. 6.4 provided for resources of 15 million euros per year to be allocated to the Regions to allow planning of leave for training and reduction of the hourly quota (financing device repealed with the Jobs Act).

- Law 236/1993 (continuous training in enterprises, financing of agreed training plans and division of responsibilities for the state, regions and provinces) thus attributed to the regions and the autonomous provinces the responsibility for planning and defining the priorities for intervention in training and support for workers and enterprises

The Higher Education Quality Assurance has been introduced in Italy by Law n. 240/2010 and Legislative Decree n.19/2012 and is guaranteed by ANVUR (Italian National Agency For The Evaluation Of Universities And Research Institutes) that defines and manage the accreditation process for University Institution and for "standard" Bologna Process programs: Bachelor Degrees, Master Degrees and PhD programs through the Italian Higher Education Quality Assurance system, called AVA (Autovalutazione, Valutazione periodica, Accreditamento – Self-assessment, Periodic Evaluation, Accreditation). AVA sets standards for the self-assessment by programmes and institutions, concerning their internal procedures and the outcomes of their activities, and for the external assessment of the quality assurance systems. External evaluation is based on peer review, and is carried out by experts appointed by ANVUR through on-site visits and document analysis. It addresses the following activities: Accreditation of new Universities and programmes; Periodic accreditation of Universities and their programmes.

In each University the Quality Assurance (QA) key actors are the following: the Nucleo di Valutazione (Independent Evaluation Unit – NdV), the Commissioni paritetiche docenti-studenti (Joint Teaching-Student Committees – CPDS), the Presidio di Qualità (Unit responsible for the internal QA system – PQA).

"University Master" programs, both of 2nd and 3rd cycle, are currently not subjected to an accreditation process. A University can setup its own Master Program; a University Master has to last at least 1 year and maximum 2 years, providing from 60 to 120 ECTS credits. The Academic Senate deliberate about University Master programs activations.

Currently, in Italy there are no formally short learning programmes (SLPs) included in lifelong learning programmes, (LLP) or in continuing education programmes (in italian “formazione continua” intending both the continuing vocational training (CVT) and the continuing professional development (CPD).

However, there is possibility to acquire ECTS participating in specific supplementary courses organized by Universities considering specific needs emerging from the public. These programs meet other characteristics of SLPs but don’t need formal accreditation by third parties, they provide ECTS credits and can be used as building blocks of more wide, formal programs (as Bachelor or Master Degree programs).

Finally, for those who are part of a professional association (Ordine) or register (Albo), since 2012 there is a legal obligation regarding to a continuing professional development (Ministerial Regulation No. 137 of August 7, 2012 regulating legal professions, reform of professional system). This results in a market demand for short courses providing ECTS credits, coming from specific professional associations. For this purpose, there are special agreements stipulated between national councils/associations/registers and universities for recognition of training and professional credits. The continuous professional training provided by the university must be accredited to the national order or council. Each Order or Register defines its own rules. In most cases, a program has to be "accredited" by the specific Order to be considered valid for CPD. In other cases (the Register mentioned below), there is just an equation stating that 1 ECTS is equal to 8 professional credits, opening the doors to university courses.

For all type of CVET funded by ESF (European Social Fund) or ERDF (European Regional Development Fund) the European and National and local legislation on management, monitoring and audit of Structural Funds must be followed.

3.2.2.3 Quality Assurance System and Requirements

Italy Quality Requirements	
GENERAL OVERVIEW	In Italy the Quality Assurance in Vocational Education and Training is guaranteed through the national and regional law and the provincial laws of the Autonomous Provinces of Trento and Bolzano. In October 2017 the Italian Ministry of Education, University and Research, the Ministry of Labour and Social Policy, the Italian Regions and the Autonomous Provinces of Trento and Bolzano have realised the revised and updated version of the **Italian National plan for the quality assurance of the education and training system** [2]. The document, approved on 21th December 2017, answers to the recommendation EQAVET OF 2009 presenting the Quality Cycle in Italy.
1st STAGE: PLANNING **&** **2nd STAGE: IMPLEMENTATION**	About the planning phase, according to what is established by the Legislative Decree 112/98 and by the reform of Title V of the Italian Constitution, it is up to the Regions to plan the school network, as well as the planning of the regional training offer integrated between education and vocational education and training activated at state and peer educational institutions of the second cycle of education. It follows a programming process that must respect and take into account the standards defined at national level and which also involves other local bodies (provinces, metropolitan cities, municipalities). Professional training activities are generally designed with reference to learning outcomes described by professional profiles / figures, specified in terms of skills and collected in the context of regional repertoires that have value in the specific territory. The reference standards for the three-year and four-year courses of vocational education and training, post-qualification and post-diploma courses (IFTS), as well as for non-university higher education courses (ITS) have been defined through agreements between the State and the Regions and therefore have national value. The same training standards apply to apprenticeship courses for the achievement of qualifications of the entire system of education and vocational training at secondary and tertiary level. On the other hand, collective bargaining is assigned the task of defining professional standards for vocational apprenticeships. At system level, the Ministry of Education, University and Research identifies minimum standards and guidelines (national indications for curricula, time frames, hours of flexibility, etc.) of reference for individual autonomous educational institutions; it also identifies the minimum requisites for teachers and promotes competition procedures for recruitment (DD.PP.RR.: 87 ,88,89 2010, Law n. 107 13/07/2015, Decree n. 61 13/04/2017). In compliance with existing procedures, the planning and implementation of the IeFP at the system level must include, where not already provided: - the use of mechanisms, procedures and tools to define training needs; - the involvement of stakeholders in the definition of the vocational education and training objectives, as well as the definition of implementation plans; - the link with vocational education and training objectives to European objectives; - the definition and monitoring of objectives through specific indicators; - an information policy to ensure optimal dissemination of results; - interventions to verify and ensure the quality of the system and of the school and training offer; - the procedures for analysing the results and reprogramming the activity; - examining the necessary resources, user capabilities and the necessary support tools and guidelines; - the guidelines and implementation rules at the various levels; - specific support for teacher training; - a clear description of the responsibilities of VET providers in the implementation process; - the identification of the responsibilities and functions attributed to persons / bodies in the field of quality assurance; - the link between regional planning and the programming of the Interprofessional Funds for continuous training, where possible.

	The law n. 107 13/07/2015 establishes that at training structure level the Teaching Body develops the three-year plan of the educational offer, a document where is the educational and training offer of the Institute are explained, enhancing the resources (human, professional, territorial, technological and economic) that it has available. The document is approved by School Council. The Plan has to be reviewed and implemented in the light of the following descriptors: - to consider in the local objectives, the European, national and regional political objectives in the field of vocational education and training; - define and monitor explicit objectives and targets; - organize ongoing consultation with stakeholders to identify specific local and individual needs; - explicitly assign responsibilities for quality management and development; - involve staff in planning, including as regards quality development; - envisage cooperation initiatives with other professional education and training providers; - have an explicit and transparent quality system; - appropriately allocate internal resources for the purpose of achieving the objectives set in the implementation plans; - promote relevant and inclusive partnerships for the implementation of the envisaged measures; - define a strategic plan for the development of staff skills that specifies the training needs of trainers; - regularly update staff and cooperate with external parties to strengthen capacity and quality improvement and increase performance. Finally the legislative decree 13/2013 must be mentioned. It defines the general rules and essential levels of performance for the identification and validation of non-formal and informal learning and the minimum service standards of the national skills certification system.
3rd STAGE: EVALUATION **&** **4th STAGE: REVISION**	About the evaluation phase, MIUR enacts each 3 years the strategic priorities for the evaluation of the education system that are defined in the guidelines adopted in agreement with the Unified Conference after consultation with the Minister of Labour and social policies. DPR 80/2013 establishes the National evaluations system with the aim of evaluating efficiency and effectiveness of the national educational and training system, framing the evaluation in the international context with the support of INVALSI[1] (Istituto nazionale per la valutazione del sistema educativo di istruzione e di formazione) and INDIRE[2] (Istituto nazionale documentazione innovazione ricerca educativa). On the basis of art 6 of DPR 80/2013 the evaluation process of educational and training institution is split in 4 steps: a) **self-assessment:** 1. analysis and verification of the own service on the basis of the data made available by the information system of the Ministry, the findings on the learning and the elaborations on the added value returned by the INVALSI, as well as other significant elements integrated by the same school; 2. preparation of a self-assessment report in electronic format according to a reference framework prepared by INVALSI, and formulation of an improvement plan; b) **external evaluation**: 1. identification of situations to be verified, based on efficiency and effectiveness indicators defined by INVALSI; 2. visits to the centres; 3. redefinition of improvement plans based on the results of the analysis carried out by the teams; c) **improvement actions**: definition and implementation of improvement interventions also with the support of INDIRE or through collaboration with universities, research bodies, professional and cultural associations; d) **social reporting**: publication, dissemination of the results achieved, through comparable indicators and data, both in a dimension of transparency and in a dimension of sharing and promotion to improve the service with the community to which they belong.

1 https://www.invalsi.it/invalsi/index.php
2 https://www.indire.it/en/

	The national evaluation system includes the evaluation of school managers and the evaluation of learning carried out by INVALSI through periodic and systematic checks on the knowledge and skills of students and on the overall quality of the training offer of the educational and vocational education and training institutions, including in the context of lifelong learning. INVALSI makes also periodic and systematic checks on students' knowledge and skills and on the overall quality of the training offer of VET institutions, including in the context of lifelong learning. One of the evaluation system measures is the “Anagrafe Nationale degli Studenti e Laureati” established with Ministerial Decree n. 9 30/04/2004. In fact,, one of its objectives is to evaluate the effectiveness and efficiency of training processes through timely monitoring of the careers of those enrolled in the various study courses. When the Professional education and Training is funded by the ESF the provisions and procedures that characterize the use of structural funds are adopted. Regarding the revision the National Plan provides the use of the Peer Review whose model is defined by INAPP (Istituto Nazionale per l'Analisi delle Politiche Pubbliche) that is also the Italian Reference Point of EQAVET.
VALIDATION & ACCREDITATION	In March 2008 the "Agreement between the Ministry of Labour, Health and Social Policies, the Ministry of Education, University and Research, the Regions and PAs of Trento and Bolzano was approved for the definition of minimum standards of the new accreditation system for training structures for the quality of services ". The accreditation model is based on some guiding principles, which constitute its pillars: - lifelong learning - maintenance of the requirements and effectiveness of controls - simplification and verifiability of requirements - integration and synergy in controls The guiding principles of the Agreement have been divided at an operational level into five criteria which can be considered the dimensions of the quality of the training offer: - Criterion A "Infrastructural and logistic resources" measures the quality according to variables of a structural nature and concerns specific conditions of buildings and equipment, with the aim of ensuring that the environments in which the implementing body organizes and delivers the services are suitable in terms of safety and comfort; - Criterion B “Economic and financial reliability” defines a basic level of economic and financial reliability of the implementing body and the integrity of its legal representative; - Criterion C "Management skills and professional resources" detects the ability of the training structure to govern the various work processes necessary for the provision of the training service and, in particular, the quality of the professional credentials held by the operators who oversee the processes; - Criterion D "Effectiveness and efficiency" evaluates, on the basis of previous experience, the ability of the training structure to adequately supervise the work processes, including those related to economic and financial management, in order to produce quality performance; - Criterion E "Relations with the territory" detects the ability of the implementing body to create synergies with the local training, social and production system. Following the approval of the State-Regions Agreement in 2008, the Italian regions and the autonomous provinces of Trento and Bolzano, as well as the Ministry of Education have legislated their own accreditation regulations- Criterion E "Relations with the territory" detects the ability of the implementing body to create synergies with the local training, social and production system. Following the approval of the State-Regions Agreement in 2008, the Italian regions and the autonomous provinces of Trento and Bolzano, as well as the Ministry of Education have legislated their own accreditation regulations.

NATIONAL ENTITIES RESPONSIBLE	Ministero dell'istruzione, dell'università e della ricerca (Ministry of Education, University and Research), Ministero del lavoro e delle politiche sociali (Ministry of Labour and Social Policy), Regioni, Provincie Autonome di Trento e Bolzano, Agenzia Nazionale per le Politiche Attive del Lavoro (ANPAL), INVALSI, INDIRE, Anagrafe Nazionale degli Studenti e dei Laureati
SOURCES CONSULTED	"Vocational education and training in Italy", CEDEFOP, Luxembourg: Publications Office of the European Union, 2014 "Piano nazionale per la garanzia di qualità del sistema di istruzione e formazione" Ministero del lavoro e delle politiche Sociali, MIUR, Regioni e Provincie Autonome Coordinamento regionale, Ottobre 2017 http://oa.inapp.org/xmlui/handle/123456789/129 "L'accreditamento delle strutture per la formazione professionale" ISFOL, 2016 "WP2: Concept And Role Of SLP In European Higher Education - Italy" UNINETTUNO

Table 3. Italy Quality Requirements

3.2.3 Malta

3.2.3.1 Initial Vocational Education and Training (IVET) System: Overview

IVET in Malta mainly starts at post-secondary level and is intended as an alternative to general academic education. It provides a vocational education pathway for individuals who may not want to pursue the academic route. IVET has also been integrated in the Malta Qualifications Framework (MQF) providing a level of parity with academic education in terms of acknowledgement and accreditation. Through this integration, IVET now also features from the lowest level of the framework, level 1, right up to level 5. In fact, vocational subjects have also been introduced at the upper secondary level and were meant to provide another alternative educational and training pathway to early school leavers.

The two main state institutions which provide IVET are the Malta College of Arts, Science and Technology (MCAST) and the Institute of Tourism Studies (ITS). MCAST has also introduced advanced courses leading to MQF level 6 (Bachelor's degree level). ITS provides courses within the tourism and hospitality sector up to MQF level 5, followed by the possibility of a continuity to a degree at MQF level 6 at the University of Malta. The inclusion of MQF level 6 within the VET sector contributes to bridging the gap between the academic and VET pathways.

These state VET institutions, MCAST and ITS, are regulated by the Education Act, which specifies their scope and organisational structures. They are also legally empowered to issue qualifications.

Whilst it is mainly these two institutions which provide IVET courses, some private providers also provide such courses, ranging from ICT to Beauty and Performing Arts.

3.2.3.2 Continuous Vocational Education and Training (CVET) System: Overview

CVET is mainly provided to adults as part of reskilling/upskilling training and job seeking assistance for unemployed persons. CVET is also offered by state institutions. MCAST offers part-time evening courses for upskilling purposes. ITS also offers similar evening courses within the tourism, catering and hospitality sector. Such courses are intended for persons who are already employed and are seeking to obtain further qualifications to improve their employability and career progression possibilities.

Another state entity, Jobsplus, formerly known as the Employment and Training Corporation (ETC), provides courses and training programmes for jobseekers and unemployed persons. These programmes are usually outsourced to private training providers. Another state institute providing adult VET in the form of evening courses is the Directorate for Lifelong Learning (DLLL) with courses ranging from arts and craft to ICT.

CVET has become increasingly popular with private institutions. Such training is offered in various sectors, with ICT being the most popular. Most of these CVET private institutions provide courses which are accredited by foreign accreditation bodies.

3.2.3.3 Quality Assurance System and Requirements

Malta Quality Requirements	
GENERAL OVERVIEW	All VET providers, as with all other institutions providing further and higher education in Malta, must be licensed by the Malta Further & Higher Education Authority (MFHEA). Licensed providers are regulated by the *Subsidiary Legislation 607.03 – Further and Higher Education (Licensing, Accreditation and Quality Assurance) Regulations*. The National Quality Assurance Framework gives guidance to educational institutions and training providers on the processes of *Internal* and *External Quality Assurance* (IQA) (EQA). This enables them to improve the learning outcomes of their programmes. The framework follows six principles as mentioned below: 1. The framework is based on European standards and guidelines and supplemented by the European Quality Assurance in Vocational Education and Training (EQAVET). The latter has been adapted to the Maltese context; 2. It fosters a national quality culture which can in turn increase satisfaction and the number of service users, enhances the international profile and credibility of local providers and promotes the country as a regional provider of excellence in further and higher education; 3. IQA should be designed to be fit for purpose according to the provided course and the end users; 4. EQA should promote development and accountability for all stakeholders, including learners and employers; 5. The framework shall revolve around the learning outcomes-based Quality Cycle; 6. The NCFHE shall act with integrity and impartiality in its EQA function. Furthermore, in order to ensure adequate IQA standards, licensed institutions are required to adhere to the following principles: • They must introduce a policy for internal quality assurance; • They must guarantee financial probity; • Self-accrediting institutions must have documented processes for the design and approval of their programmes whilst other institutions shall follow the set programme accreditation procedure; • Institutions shall deliver programmes in such a way that students are encouraged to take an active role in creating the learning process; • They shall comply with published regulation relating to student admission, progression, recognition and certification; • They shall ensure their teaching staff are competent; • Adequate funding for teaching and learning activities must be made available; • Information for the effective management of the programmes should be collected and analysed • Accurate, updated and objective information on the courses and programmes must be published and made accessible; • Constant monitoring and frequent reviews of courses and programmes shall be made so as to ensure that the objectives are being met and adapt the programmes according to the changing needs of students, the labour market and society; • Institutions shall undergo an EQA process once every five years. In general, Malta follows QA indicators which are based on the ten indicators developed as part of EQAVET. These are used to give an indication of the degree of quality within VET institutions. These indicators are: • Investment in training of teachers and trainers • Involvement of teachers and students in QA • Participation rate • Completion rate • Placement rate • Utilisation of acquired skills at the workplace • Mechanisms to identify training needs in the labour market

	• Schemes used to promote better access to VET • Self-evaluation • Trans-institutional relations
1st STAGE: PLANNING	The *planning* stage involves the actual planning of the VET programmes and it is crucial to ensure that the planned programmes are of a high quality. First and foremost, the training must be relevant to the sectors being targeted. Successful candidates must acquire the skills and competencies deemed relevant by the sector. Aspects which should be looked into include: • How both European and national VET policy goals/objectives are reflected in the targets set for the training; • How these goals/objectives are clear and understandable; • Effective consultation with relevant stakeholder in order to identify specific needs for the sector, both locally and internationally; • Personnel tasked with the oversight of quality management and development; • The involvement of staff in the planning of VET.
2nd STAGE: IMPLEMENTATION	The *implementation* stage is where the actual delivery of the training programmes to students takes place. The training delivery, whether IVET or CVET, must be of a high quality and, in this respect, the following aspects should be considered: • The effective assignment of staff and other relevant resources; • Collaboration possibilities and how such collaborations can support the implementation of training programmes; • Staff competence development with a strategic plan specifying the need for continuous training of trainers; • Staff collaboration with external stakeholders to promote the further development of skills and competencies in their field.
3rd STAGE: EVALUATION	The *evaluation* stage ensures that high quality training is being delivered and that the programmes were designed and implemented properly. The outcome of the training programmes must therefore be evaluated. Evaluation can be carried out both during the training and after the training has been completed. In fact, it is recommended to conduct evaluations at both stages. The following aspects should be taken into account when carrying out the evaluation process: • How often is evaluation (both internal and external) carried out; • The extent at which possible improvements are identified; • The extent of the evaluation itself and whether it takes into account a full range of views; • The involvement of both internal and external stakeholders; • How well the evaluation stage can predict problems or issues.
4th STAGE: REVIEW	The outcomes derived from exercises performed at the *evaluation* stage are used to take any required action at the *review* stage. This stage is very important since it is the one in which the real improvement can be made and the one which pushes the quality of training provision upwards. Furthermore, any shortcomings identified during the evaluation of training programmes must be followed by concrete action. The following aspects should be considered at this stage: • The process whereby feedback from individual students on their learning experience and environment is collected and combined with trainers' feedback so as to develop concrete action plans; • The publication of review outcomes; • Review planning and the process by which their outcomes lead to an improvement in the provision of training programmes; • The extent to which reviews are shared.
VALIDATION & ACREDITATION	• Accreditation is part of the remit of the Malta Further and Higher Education Authority (MFHEA). • Accreditation is required at two levels: provider/institution and programme. • The accreditation process is different for self-accrediting institutions and non self-accrediting institutions. The University of Malta (UM), MCAST and ITS are self-accrediting organisations. They are exempt from provider and programme accreditation by MFHEA but are subject to external QA

	audits. Other VET providers have to submit an application to MFHEA with programme details. This application is vetted, reviewed and validated by the MFHEA and an evaluator. • Accreditation of programmes is in line with the Malta Qualifications Framework (MQF) which is referenced to the European Qualifications Framework (EQF) and the Qualifications Framework of the European Higher Education Area (QF/EHEA). • In order to apply for accreditation, a provider shall ensure availability of the following: qualified academic staff, an IQA policy, a training venue, a Head of Institution and information on the courses provided by the institution, its owner and its legal representative. If the institution intends to deliver any of its courses online, digital provision must also be demonstrated.
NATIONAL ENTITIES RESPONSIBLE	The main responsible entity is the Malta Further & Higher Education Authority (MFHEA). The MFHEA has a number of functions, including: licensing, accreditation, quality assurance, and policy recommendation. The entity also encompasses the Malta Qualifications Recognition Information Centre (MQRIC) which is the competent body that recognises qualifications against the Malta Qualifications Framework (MQF).
SOURCES CONSULTED	• Report of Malta Summer 2016 • Developments in vocational education and training policy in 2015–19 • Implementation of Quality Assurance In Vocational Education & Training (VET) Institutions - A Manual for VET Providers • National Vocational and Education Training Policy • Referencing the Malta Qualifications Framework (MQF) to the European Qualifications Framework (EQF) and the Qualifications Framework of the European Higher Education Area (QF/EHEA) • Subsidiary legislation 607.03 - Further and Higher Education (licensing, accreditation and quality assurance) Regulations • The National Quality Assurance Framework for Further and Higher Education • www.mfhea.mt – Malta Further & Higher Education Authority

Table 4. Malta Quality Requirements

3.2.4 Portugal

3.2.4.1 Initial Vocational Education and Training (IVET) System: Overview

The IVET in Portugal is overlapping with the Post-Secondary non-tertiary education system, so for completing the basic education we have the courses that provide vocational qualifications, that can be:

-Vocational courses: secondary-level training that last for 3 academic years and leads to Level 3 of EQF and a diploma in secondary education.

-Courses under the apprenticeship system: initial alternance training, intended for young people – between 15 and 25 – and that leads to Level 2 and a certificate of completion of Cycle 3 of basic education, or a Level 3 EQF and a certificate of completion of secondary education.

-Education and training courses: intended for people aged 15 or over who left or are in risk of leaving the regular education system and for young people who have completed 12 years in school and wish to acquire a vocational qualification; lead to an academic certificate equivalent to year 9 or 12 of school and a Level 2 or 3.

-Other courses include specialised art courses and technology courses (that leads to a diploma of secondary education and a level 3 EQF.

In the post-secondary (non-tertiary) we have Specialized Technology Courses that provide a non-tertiary vocational education and training (and leads to a diploma of specialised technology and a Level 4 vocational certificate).

3.2.4.2 Continuous Vocational Education and Training (CVET) System: Overview

The National Qualification Catalogue is a framework that reflects the system of continuing vocational and training in Portugal: a range of flexible training pathways which make it possible to build a vocational qualification project organised in short credit units that allow for the independent certification of skills.

Target groups and goals:

-Adults at working age (employed, unemployed and in risk of exclusion) which includes adult education and training courses that are intended to raise academic ability and vocational qualifications and enhance employability and certification of acquired learning (IEFP).

-Courses aimed specifically at groups that face problems in joining the labour market (IEFP).

Continuous vocational education and training at the initiative of enterprises or social partners in accordance with the Labour Code that enshrines in law the employers' obligation to ensure that every year, workers with permanent contract receive a minimum of 35 hours certified training each year (Private Corporations).

3.2.4.3 Quality Assurance System and Requirements

Portugal Quality Requirements	
GENERAL OVERVIEW	Portugal adopted the main structure of EQAVET framework: 4 stages, quality criteria for each and descriptive indicators. Four fundamental EQAVET principles have been defined to be observed in the alignment, as it is understood that they are decisive for enhancing the quality of VET, being subject to verification, once the process has been carried out: (i) strategic vision and visibility of the processes and results in the management of VET; (ii) involvement of internal and external stakeholders; (iii) continuous improvement of VET using the selected indicators; (iv) use of the four phases of the quality cycle (planning, implementation, evaluation and review). The EQAVET principles have been incorporated into each of the quality criteria, allowing a grouping of the listed management practices; except this logic of incorporation of the principle associated with the use of the four phases of the quality cycle, since the structuring of the alignment framework into four corresponding to the phases of the cycle already guarantees this assumption. EQAVET Indicators: In Portugal, the EQAVET indicators prioritized by the ANQEP, I.P. to integrate the national model were the following: - Rate of completion in VET courses (indicator no. 4 of EQAVET) a) Percentage of students / trainees completing initial VET courses (ie that obtain a qualification) in relation to the total number of students / trainees who enter these courses. - Placement fee after completion of VET courses (indicator no. 5 of EQAVET) a) Proportion of students / trainees who complete a VET course and who are in the labour market, in training (including higher education) or other destinations, in the 12-36 months after completing the course. - Use of skills acquired in the workplace (EQAVET indicator 6) a) Percentage of students / trainees completing a VET course and working in professions directly related to the Education / Training course / area that concluded. b) Percentage of employers who are satisfied with the trainees who completed a VET course.
1st STAGE: PLANNING	**Quality Criterion** The Planning should reflect the strategic vision shared by the stakeholders and include the goals / objectives, the actions to develop and the suitable indicators.

	Indicative Descriptors - How European, national and regional political objectives / objectives are reflected in the local objectives set by VET providers - Explicit goals / objectives are set and supervised - A permanent consultation is organized with the defined parties in order to identify specific local / individual needs - The responsibilities for quality management and development have been explicitly assigned - The staff has been involved in knowledge since the beginning of the process, namely with regard to the development of quality - Providers plan cooperation initiatives with other VET providers - The required parties participate in the process of analysing local needs - VET providers available with an explicit and transparent quality assurance system
2nd STAGE: IMPLEMENTATION	**Quality Criterion** Action plans, designed in consultation with stakeholders, derive from the goals / objectives to be achieved and are supported by diverse partnerships. **Indicative Descriptors** - Resources are appropriately calculated / allocated internally with a view to achieving the objectives outlined in the application - Relevant and comprehensive partnerships are explicitly supported to carry out the planned actions - The strategic plan for the development of staff competencies indicates the need for training for teachers and trainers - Staff regularly attend training and develop cooperation with external stakeholders in order to support the capacity building and quality improvement and enhancing performance
3rd STAGE: EVALUATION	**Quality Criterion** The evaluation of results and processes regularly carried out allows to identify the necessary improvements. **Indicative Descriptors** - Self-assessment is carried out periodically in accordance with regional or national regulatory frameworks, or at the initiative of VET providers - Assessment and review cover teaching processes and results, including assessing learner satisfaction, as well as staff performance and satisfaction - Evaluation and review include adequate and effective mechanisms for engaging stakeholders internally and externally - Early warning systems are implemented
4th STAGE: REVISION	**Quality Criterion** The results of the evaluation are used to develop action plans appropriate to the review of existing practices. **Indicative Descriptors** - Trainees' impressions are collected about their individual learning experiences and the learning and teaching environment. They are used in conjunction with the teachers' impressions, to inspire new actions - Wide public knowledge of the information on the results of the review is given - The procedures for collecting feedback and reviewing are part of a strategic learning process for the organization

	- The results of the evaluation process are discussed with stakeholders, with appropriate action plans being drawn up
VALIDATION & ACREDITATION	To have EQAVET stamp and recognition for a training is a long process available for the Educational entities, which includes four stages and several documents.
NATIONAL ENTITIES RESPONSIBLE	Directorate-General for Employment and Industrial Relations (DGERT) Institute for Employment and Vocational Training (IEFP) Cabinet for Strategy and Planning (GEP) Observatory for Employment and Vocational Training (OEFP) Inspectorate-General of Education (IGE) Cabinet for Education Statistics and Planning (GEPE) Directorate-General for Innovation and Curricular Development (DGIDC) National Qualifications Agency (ANQEP – Official Entity responsible for EQAVET implementation in Portugal)
SOURCES CONSULTED	ANQEP (2020). Guia para o Processo de Alinhamento com o Quadro EQAVET: Garantia da Qualidade na Educação e Formação Profissional. ANQEP, I. ANVUR website https://www.anvur.it/en/homepage/ https://www.eqavet.eu/ https://www.anqep.gov.pt/np4/home.html

Table 5. Portugal Quality Requirements

3.2.5 Turkey

3.2.5.1 Initial Vocational Education and Training (IVET) System: Overview

In order to enable students to receive education in line with their possibilities, after compulsory education students can enrol in formal and technical education or non-formal education (as an alternative).

Student admissions to vocational high schools may vary according to the type of school, the field and branches to be selected. Transfers of students between school types and programs and transfers between schools can be made under certain conditions. Diplomas are issued to students according to the type of school, program, field and branch in which they complete their education.

Formal education provided within the scope of vocational and technical education is carried out in three types of schools: Vocational and Technical Anatolian High Schools, Multi-Program Anatolian High Schools and Vocational Education Centers. Vocational and technical education within the scope of non-formal education is provided in Open Vocational High Schools. Educational processes vary according to school types.

• In the Anatolian Vocational Program, there are general knowledge lessons as well as knowledge and skills for a profession.

• In the Anadolu Technical Program, in addition to the knowledge and skills for a profession, mathematics, physics, chemistry and biology lessons are mainly given for 4 years.

• In both programs, vocational training is given in the 10th grade, and branch training is provided in the 11th and 12th grade depending on the profession.

• Registration to Anatolian Vocational Programs is made with no examination and local placement.

• Placement to the Anadolu Technical Program is made through a central examination.

• Multi-Program Anatolian High Schools; They are secondary education institutions that implement general and vocational and technical education programs under a management.

• Vocational Training Centers are training institutions where journeyman and mastership training and vocational and technical course programs are implemented.

• Registration to vocational training programs without examination and local placement is made.

• In vocational education programs, a field and branch selection is made starting from the 9th grade. In order to start the education, it is necessary to have a workplace suitable for the field and branch to be trained and to be a master instructor. One or two days of theoretical training, four or five days of vocational training is given in the workplace.

• In Vocational and Technical Anatolian High Schools, curricula are implemented in 54 fields and 199 branches under these fields.

• In Vocational Education Centers, curricula are implemented in 27 fields and 142 branches under these fields.

Vocational Training Centers: Students are registered in Vocational Education Centers to receive journeyman and mastership training.

Registration conditions for Vocational Education Center programs:

a) To be a graduate of at least secondary school or imam-hatip secondary school.

b) Being suitable for doing the jobs required by the profession in which he / she will be employed, with his / her structure and health condition.

In order to start education, it is necessary to have a workplace suitable for the field and branch to be trained, and to have a master trainer and sign the MoNE Vocational Training Contract in Enterprises. Vocational Education Center program students; It has the status of a student and benefits from all kinds of student rights.

Vocational Education Centers (apprenticeship training) are included in the scope of compulsory education in order to meet the apprentice needs of tradesmen and craftsmen, who are the cornerstones of the economy, and to train students as masters with on-the-job training with the master-apprentice relationship from the ahi culture. Students who have completed the Vocational Education Center programs have the right to go to higher education if they receive a diploma by completing difference courses in line with their wishes.

Students attending Vocational Education Center programs are taken to the end-of-year skill exam at the end of each academic year starting from the 10th grade. The skill exam journeyman entered at the end of the 11th grade is administered as the skill exam entered at the end of the 12th grade as a mastery exam. Before starting to employ the candidate apprentice and apprentice, the owner of the workplace has to make a vocational training agreement with him / her, if he / she is a parent or guardian, or if he / she is of legal age.

3.2.5.2 Continuous Vocational Education and Training (CVET) System: Overview

Lifelong learning activities in Turkey have also been mobilized with the effect of European Union membership initiatives and have gained importance in order to accelerate the integration process into this union.

Universities also have great responsibilities in providing lifelong learning skills to individuals in the community. After the 1950s, the "community services" function was added to the "research" and "teaching" functions of universities, which are traditional functions. On the other hand, it has been revealed that higher education has an important contribution to the implementation of lifelong learning in the "Bologna Process", which is a milestone for universities.

Universities often try to provide lifelong learning services through SEM (Continuing Education Center) or Lifelong Learning Centers. It is noteworthy that SEMs are the majority in universities in Turkey. In this direction, universities in Turkey try to fulfil these missions with the SEMs they host.

In this context, it is aimed to provide access to the databases of the largest lifelong learning institutions in the country with the Lifelong Learning Portal. Training and job opportunities offered by İŞKUR (Turkish Employment Agency) and other public and private organizations, and the course programs offered by Public Education Centers affiliated to the Ministry of National Education, General Directorate of Lifelong Learning, are available on this portal.

In addition, the Ministry of National Education Lifelong Learning Portal is an important innovation prepared as "the gateway to learning and working opportunities". In addition to current learning and employment opportunities, the portal provides lifelong guidance information for individuals' professional and personal development needs.

In the Lifelong Learning Portal, where data from various service providers are collected, information is provided on all learning opportunities, from basic education to higher education, from non-formal education to distance learning.

3.2.5.3 Quality Assurance System and Requirements

Turkey Quality Requirements	
GENERAL OVERVIEW	Turkish Qualifications Framework (TQF); Designed to be compatible with the European Qualifications Framework (EQF); It is a national qualifications framework that shows all qualification principles acquired through vocational, general and academic education and training programs and other learning pathways, including primary, secondary and higher education. TQF covers all qualifications with quality assurance acquired in all learning environments and at various levels within the education and training system in our country. TQF is designed in a structure consisting of eight (8) levels. In the TQF, each level is defined according to the common learning outcomes of the qualifications at that level. The set of definitions related to learning outcomes defining each level in terms of knowledge, skills and competencies is called the level descriptor and the level descriptors form the core of the TQF. Level descriptors provide the basis for all other structures and tools within the TQF. In the design of the TQF, the philosophy and structure of our country's education and training system and its basic characteristics directly related to the TQF were taken into account. In accordance with the National Education Basic Law No. 1739, the national education system has been designed in an integrated structure to meet the educational needs of the citizens, and the "formal education and training" offered in pre-school education, primary education, secondary education and higher education institutions and "non-formal education and training" offered within the scope of lifelong learning. It consists of. There are distance education and open education options in both formal and non-formal education and training. Formal education; It includes pre-school, primary education, secondary education and higher education institutions. There is a 12-year compulsory education process that follows pre-school education, which is included in formal education and training. Higher education in Turkey is coordinated by the Higher Education Council (YÖK) and all academic and vocational education and training provided by higher education institutions after secondary education covers. Higher education consists of three main levels (bachelor, master and doctorate) and a short level (associate degree) defined in the context of the Bologna Process. Apart from dentistry, pharmacy, medicine and veterinary programs, which are the programs in which the first and second levels (undergraduate and graduate) are integrated, other higher education programs have a three-level (undergraduate, graduate and doctorate) structure. The general goal of TQF is to provide an integrated structure in which all qualifications in our country are defined, classified, and as a result, relationships such as transition and progress between qualifications are determined. Meetings with stakeholders, consultation processes, examination of many policy and strategy documents related to TQF, education and training system and labour market characteristics and requirements As a result of the comprehensive researches on the experience of other countries in the NQF development process, the main objectives of the TQF have been determined: a) Establishing a clear and consistent method for defining, classifying and comparing qualifications. b) Providing an integrated framework covering all quality assured qualifications (acquired in general, vocational, academic education and training programs and other learning environments) .14 Turkish Qualifications Framework c) To continuously improve the qualification system so that the competencies gained by the individual are recognized in formal, non-formal and informal learning environments.

	d) Contributing to raising individuals with defined and measurable qualifications, employable, and thus reducing unemployment. e) To develop the institutional cooperation of all relevant parties, especially the relevant institutions and organizations responsible for qualifications, the business world and social stakeholders. f) To establish the basic criteria for the recognition of the qualifications of other countries in Turkey and the qualifications in Turkey abroad, and thus to function as a comparison. The NQF Preparation Commission evaluated the national needs and priorities expected to be met by the TQF.
1st STAGE: PLANNING	There are competencies that are quite different from each other in Turkey, which are widely known and used in the education and business world. In addition, national qualifications in line with international trends and the EQF approach are developed under the responsibility of VQA. The goal of including the qualifications prepared with different approaches within the same framework and creating a single structure caused significant difficulties in the design of the TQF. These difficulties have been taken into account in the design of the TQF in order to achieve the targets set for the TQF. A single integrated structure that will support lifelong learning is provided, where all quality assured qualifications will be defined, classified and thus the relationships between qualifications will be determined, transparency and recognition of qualifications will be ensured. A reference framework for existing qualifications has been established with the TQF. In addition, TQF in the implementation process; a) Development of new qualifications, b) Recognition of prior learning, c) Determining horizontal and vertical transfer opportunities between qualifications, d) It will provide the opportunity to ensure the international comparability of qualifications. Turkish Qualifications Framework TQF is designed to cover all qualifications obtained as a result of experience-based learning and independent individual learning in workplaces or other non-formal and informal learning environments, as well as defined and sequential school education at all levels. The TQF also enables the development of the competencies of individuals with special needs to ensure appropriate recognition of learning outcomes. TQF has a structure consisting of level and level descriptors. Levels are defined through level descriptors and supported by qualification types. Qualification types, on the other hand, are defined by qualification type specifications. The above-mentioned elements form an integrated tool group, thus providing a flexible structure that can define all kinds of competencies, as well as a design opportunity that will support the development of appropriate competence for all kinds of learning outcomes groups.
2nd STAGE: IMPLEMENTATION	In accordance with Article 23 / A of the Law No. 5544, the procedures regarding the establishment, development, maintenance of the TQF and determination of the quality assurance criteria of the qualifications to be included in the framework will be carried out by VQA. Within the scope of the aforementioned article, for the formation and execution of the TQF, it is stipulated to establish advisory, decision and implementation units such as the Council, Commission and Working Groups consisting of The Ministry of National Education, The Council of Higher Education, VQA and representatives of the relevant parties.
3rd STAGE: EVALUATION	In case the learning gains of the individual are measured, evaluated and successful, the procedures related to the certification of the competence are carried out by the training institutions and certification institutions authorized by the responsible institutions. Education schools and institutions affiliated to the Ministry of National Education, higher education institutions (universities, vocational schools, institutes and similar) at the beginning of the educational institutions; The leading certification bodies are the certification bodies authorized by VQA and accredited according to the TS EN ISO / IEC 170248 standard.
4th STAGE: REVISION	When the qualifications in the Turkish Qualifications Framework are changed, the effect of the change on the existing certified persons is evaluated by the responsible institution; If necessary, a regulation is made regarding the situation of these persons and if this regulation imposes any obligation on the relevant persons, this situation is notified to all

	relevant persons at least six months before the start of the application and it is published electronically. In the event that a qualification in the Turkish Qualifications Framework is cancelled by the responsible institution, the decisions regarding the status of the documents issued according to the cancelled qualification and other necessary measures are taken by the responsible institution. The competence units of the persons who have the qualification removed from the Turkish Qualifications Framework, which are still valid, are evaluated in the certification to be made according to other qualifications including these units
VALIDATION & ACREDITATION	The main function of TQF is to define qualifications with learning outcomes and to provide them with the opportunity to compare them with each other. One of the systems that can be used to compare qualifications is working. is a burden-based credit system. Therefore, it is very important to determine the workload and credit value of the learning outcomes related to the qualifications. However, free learning in particular It is very difficult to determine a tool or method that will directly measure the workload required for the acquisition of learning outcomes and qualifications acquired through the program. For this, it is envisaged to use the measurement and credit system associated with the work load in the TQF. Crediting of qualifications based on the workload will allow for credit accumulation and transfer. The recommended measure for the qualifications to be included in the TQF is 60 credits corresponding to a learning period of 1500-1800 hours. This approach is suitable for both credit systems (ECTS (ECTS) and MKTS (ECVET)) used or taken as reference in Europe. In the measurement and credit system based on workload; For each qualification type, the work load will be determined by calculating the total hours spent by an “average” learner for face-to-face, individual, workplace and all other studies in order to gain that qualification. The credit ranges obtained with the workload calculated will be included in all qualification type specifications. The credit range of the qualification types and the credit values of the qualifications are determined by the responsible institutions.
NATIONAL ENTITIES RESPONSIBLE	The Ministry of National Education The Council of Higher Education Higher Education Institutions, Turkish Employment Agency Vocational Education Centres VQA The other institutions and organizations specified in the relevant legislation for which they are responsible for the qualifications.
SOURCES CONSULTED	https://dergipark.org.tr/tr/download/article-file/750200 http://ecvet.ua.gov.tr/tr/page/E http://mtegm.meb.gov.tr/ http://mtegm.meb.gov.tr/meb_iys_dosyalar/2018_11/12134429_No1_Turkiyede_Meslek i_ve_Teknik_Egitimin_Gorunumu.pdf http://ozdegerlendirme.meb.gov.tr/ https://tyc.gov.tr/sozluk/mesleki-egitim-ve-ogretimde-avrupa-kalite-guvencesi-european-quality-assurance-in-vocational-education-and-training-eqavet-i39.html https://www.vetfestproject.eu/images/PDF/VET-Fest_PLAN_TK.pdf

Table 6. Turkey Quality Requirements

4 Quality Assurance for Skill-UP Training

This section will present a quality assurance approach for Skill-UP training design and implementation (T3.3 and T3.4) and assessment tools development (WP4), taking in consideration the EQAVET recommendation for VET providers and the national requirements for country partners: France, Italy, Malta, Portugal and Turkey. Although the Skill-UP project is not an official VET provider and does not intend to deliver systematic training, the project aims to develop training materials/resources and training assessment tools which can eventually be made available to support trainers and VET providers in the process of skilling, reskilling and upskilling themselves and/or the aeronautics workforce in Europe. For that reason, it was considered highly important to ensure alignment with National and European quality standards and requirements, which allow the further use of the Skill-UP materials on a national context and their transferability outside of the partnership.

The Skill-UP Quality assurance approach for VET considers the main tools EQAVET developed and recommended for VET providers, since they are also the basis for each country's quality approach:

- Four-stage quality criteria cycle;
- Indicators;
- Indicative Descriptors;

The six Building Blocks (BB) were considered within their relationship with the four-stage cycle approach, especially the ones directly connected with VET: (5th) Use data and feedback to improve VET and (6th) Ensure VET is based on the involvement of external and internal stakeholders. Considering the remaining Building Blocks, they are already part of Skill-UP approach towards quality of the project and their outputs, since:

Skill-UP project has a quality culture, with a Work package dedicated to quality and evaluation (WP6), led by INOVA+. The quality culture is ensured by project coordinators, which ensure all materials produced by the consortium went through a process of quality which includes internal, external and self-assessment. Also, although the quality aspects are led by INOVA+ and the project coordinator, all partners are involved in the quality process, by giving inputs or being informed of quality materials produced (Connected with 1st BB: Ensure there is a management culture which is committed to quality assurance and 3rd BB: Develop a culture of self-assessment and 4th BB: Support staff training in relation to quality assurance).

Skill-UP training development is based on a set of tasks which are aimed at understanding and analysing the targets groups' current and future needs. The data collection was carried out using a diverse set of methodologies which included quantitative (e.g. questionnaires) and qualitative (e.g. interviews and focus group) methodologies and involved the external stakeholders (Connected with 2nd BB: Develop approaches which reflect the provider’s circumstances).

4.1 Skill-UP Quality Approach for VET

The Skill-UP quality approach has as its core the Four-Stages cycle. However, since the Skill-UP will not systematically implement training, but will instead, deliver pilot training sessions for testing and further improvement, some stages are adapted to the project context (Figure 7). In order to ensure the quality of VET materials, in each phase, the Skill-UP training designers will ensure that the set of indicative descriptors of each phase are being considered (Self-assessment tool - Table 7 – 10).

Figure 7. Skill-UP Four-Stage Quality Cycle

4.2 Self-Assessment Tool for Skill-UP Quality Approach

Resulting from the data collected about the European and National quality requirements, the self-assessment tool is the concrete action of the Skill-UP project to ensure the application of the quality assurance approach. Therefore, during the process of developing the Vocational and Educational Training modules, Skill-UP project partners should reflect about the work developed by filling in the self-assessment tool before proceeding to the next phase.

4.2.1 Planning

The planning stage involves the actual planning of the VET programmes, and it is crucial to ensure that the planned programmes are of a high quality. It should reflect a strategic vision shared by the stakeholders and include goals/objectives, actions and suitable indicators. Taking in consideration the quality requirements of the five countries, in the Planning stage, Skill-UP training developers should answer the following questions:

1) Are European, national and regional VET goals reflected in the goals set for the training?
2) Are the goals/objectives and targets set explicit?
3) Are the goals described for the medium and long term?
4) Are defined indicators (success criteria) to monitor the objectives achievement?
5) Is the staff in the quality process?
6) Are the target group needs evaluated by tools/procedures?
7) Are relevant stakeholders involved/consulted in the process of analysing local needs?

The Planning Stage of the Skill-UP VET is already occurring (WP1 & WP2) and most of the above requirements have already been implemented, whilst others will be further implemented in the beginning of T3.3. Training Design.

PLANNING			
Skill-UP Indicative Descriptors	**Affirmative**	**Negative**	**Uncertain**
The European, national and regional VET goals have been reflected in the goals set for the training.			
The goals/objectives and targets have been set explicit.			

The goals have been described for the medium and long term.			
A set of indicators (success criteria) to monitor the objectives achievement have been developed.			
The staff involved have been in the quality process.			
The target group needs have been evaluated by tools/procedures.			
Relevant stakeholders have been involved/consulted in the process of analysing local needs.			

Table 7. Self-Assessment Tool for Planning Stage

4.2.2 Pilot Implementation

The pilot implementation stage is where the actual delivery of the training programmes takes place, for the different target groups. Taking in consideration the quality requirements of the five countries, in the Pilot Implementation stage, Skill-UP training developers should answer the following questions:

1) Are the Implementation plans established in cooperation with social partners and stakeholders?
2) Are the implementation plans considering resources required, capacity of the users and tools/guidelines needed for the support?
3) Are VET provider's responsibilities in the implementation process explicit?

Due to the Skill-Up project aim, the Pilot Implementation Stage is inherent to project development and will be part of T3.4.

PILOT IMPLEMENTATION			
Skill-UP Indicative Descriptors	**Affirmative**	**Negative**	**Uncertain**
The implementation plans have been established in cooperation with social partners and stakeholders.			
The implementation plans consider resources required, capacity of the users and tools/guidelines needed for the support.			
VET provider's responsibilities in the implementation process are explicit.			

Table 8. Self-Assessment Tool for Pilot Implementation Stage

4.2.3 Evaluation & Assessment

The evaluation and assessment stage ensures that high quality training is being delivered and that training programs were designed and implemented properly. Thus, processes and results should be assessed regularly in order to identify the necessary improvements. Taking into consideration the quality requirements of the five countries, in the Evaluation and Assessment stage, Skill-UP training developers should answer the following questions:

1) Is the evaluation and assessment methodology considering internal, external and self-assessment?

2) Is the assessment and review covering teaching processes and results (learners and staff satisfaction)?
3) Are performance indicators being applied?
4) Are appropriate data collection methodologies being developed/adapted to do the assessment?
5) Is the Evaluation and assessment being carried out more than once?
6) Are the Stakeholders being involved in the monitoring and evaluation process?

The Evaluation & Assessment is a stage of particular importance to Skill-UP, which aims to develop a set of training assessment tools (WP4).

EVALUATION & ASSESSMENT			
Skill-UP Indicative Descriptors	**Affirmative**	**Negative**	**Uncertain**
The evaluation and assessment methodology consider internal, external and self-assessment.			
The evaluation and assessment cover teaching processes and results (learners and staff satisfaction).			
Appropriate data collection methodologies have been developed/adapted to do the assessment.			
Performance indicators have been applied.			
Evaluation have been carried out more than once.			
The Stakeholders have been involved in the monitoring and evaluation process.			

Table 9. Self-Assessment Tool for Evaluation & Assessment Stage

4.2.4 Review & Improvements

The Review and Improvements stage is a direct consequence of the data collected during the evaluation and assessment, which will be used to take concrete actions in order to improve the training materials. Taking in consideration the quality requirements of the five countries, in the Review and Improvements stage, Skill-UP training developers should answer the following questions:

1) Is the Feedback from individual students being combined with trainer's feedback so as to develop concrete action plans?
2) Are the review outcomes available to the public?
3) Are the results of the evaluation and actions plans to address it being discussed with the stakeholders?

In Skill-UP the review will occur following the training and assessment tools pilot testing, in order to do the final improvements of the training curricula and resources.

REVIEW & IMPROVEMENTS				
Skill-UP Indicative Descriptors	**Affirmative**		**Negative**	**Uncertain**
The Feedback from individual students have been combined with trainer's feedback so as to develop concrete action plans.				
The review outcomes have been available to the public.				

The results of the evaluation and actions plans to address it have been discussed with the stakeholders.				

Table 10. Self-Assessment Tool for Review & Improvements Stage

5 Final Considerations for task 3.1

The Task 3.1: Review the recognition and validation requirements per each country, aimed to design the training curricula following the EQAVET quality standards, also considering the special requirements in each partner country. With that purpose, Part 1 of Deliverable 3.1 begins with the review of EQAVET framework, exploring their different tools and guidelines. Secondly, the national context of each country partners was reviewed and analysed, since the EQAVET adaptation to the national context can add new requirements. In general, the partner countries follow the EQAVET framework in a similar way, and four out of the five countries adopted the Four-Stage Quality Cycle and most of their indicative descriptors, with minor changes. Only Turkey is not fully adopting the EQAVET yet, however their VET system is being adapted due to the process of joining the European Union, and is therefore expected to follow EQAVET in the future as well. The result of the EQAVET and National review is the Skill-UP Quality Approach to VET, the set of quality guidelines for project partners follow through the curricula design and implementation. The Skill-UP Quality Approach to VET adapted the Four-Stage Quality Cycle and Indicative Descriptors to the project context, which is not the systematic delivery of Vocational Education and Training, but rather the design of quality training curricula and training assessment tools. Alongside with the guidelines, project partners will assess the quality of VET design through the self-assessment tool, which represents a moment to reflect about the current stage of the quality cycle before proceeding to the next one.

Additionally, it is important to highlight that in each country quality approach, most of the quality requirements are related to the systematic delivery from Education and Training entities, who need to follow a long process of quality, which involves National Policy Bodies and financial and human resources investment. Although, Skill-UP does not aim to deliver training or go through the certification/validation process, the consortium developed an exhaustive overview of the quality requirements for each national context in order to support and facilitate other entities interested in applying Skill-UP training materials in their own institutes.

Finally, the D3.1 will be shared with National Qualifications Agencies, to share the result of their input and to have their final validation and review. The relationship established with each country Qualifications Agency will be kept for further project development, since they represent an added value to the design of training curricula and resources.

6 Existing methodologies in VET: current practices

A recent review of instructional methods published in a journal on human resource development identified 13 core methods (Martin, Kolomitro & Lam, 2014): case study, games-based training, internship, job rotation, job shadowing, lecture, mentoring and apprenticeship, programmed instruction, role-modelling, role play, simulation, stimulus-based training, and team-training. From these 13 core methods, eight were selected that we considered as being most relevant for the Skill-UP project. Table 11 presents the characteristics from these eight instructional methods filled by the project partners who are experienced training providers in VET (University of Malta, QSR, Uninettuno and ENAC). This table lists, for each method, its advantages, risks, points to watch and conditions for success.

Characteristics of instructional activities currently used in VET								
Instructional method for VET	**Description**	**Suited delivery mode**	**Suited group size**	**Advantages**	**Risks**	**Conditions for success**	**Points to watch**	**Solutions**
lecture	Involves the dissemination of training material by a trainer to a group of trainees, by means of verbal instruction	Online or face to face	Small or large groups	Transmitting as much information as possible to as many people as possible	A posteriori assessment of what has been learnt ; surface remembering and understanding	The course answers questions that learners have; thus they will be active	Attention loss after 10 to 15 mn ; 10 seconds to "hook" the learner ; perception of usefulness of the course	Add an interactive activity avery 10 to 15 mn ; include a teaser in the introduction ; high link with the targeted competency : cite authentic and meaningful situations in order to facilitate transfer
case study	Provides the participant an opportunity to develop skills by presenting a problem, without a solution, for them to solve, or with a solution, as an exemple of how to solve it	Online or face to face	Small groups	Allows the mobilisation and integration of resources (knowledge, skills, attitudes) learned ; enables high levels of the taxonomy of learning objectives	The learner does not master the knowledge to be mobilised or integrated ; Possible destabilisation for some learners if there are several possible solutions	Must be cognitively challenging, achievable, not too easy ; Perceived usefulness to the learner	Loss of commitment if not guided at all or poorly guided If too difficult or too easy	Test the relevance of the case during design ; Train the trainer in individual and group tutoring
simulation	Involves the use of a simulator where specific skills are developed	Online or face to face	Individual or small groups (4-15)	Allows to increase competence and automation (skill, mobilisation and	The task presented and the situations are too complex for	Simulation must be relevant, realistic ; Prior formative	Stress management (especially when watched by the instructor) ;	Start with pedagogical guidance from the instructor towards autonomy ; Start with simple situations and

	through repeated practice with a multisensory experience of imitated conditions. A special form of simulation training is Virtual Reality training which entails total sensory immersion			integration of knowledge, attitude) in dynamic time	the learner's level	assessment of the mastery of internal and external resources	risk of learning only specific rules with no generalisation	end with the most complex situations
on the job training	Is provided at the workplace. During the training, employees are familiarized with the working environment they will become part of.	Face to face	individual	Immediate operational learning ; Complete acquisition of competence in its cognitive, psychosocial and psychomotor dimensions	Reality too complex for the learner's level. Local routines may be in contradiction with training content (e.g. "violation" of a regulatory procedure to be more efficient or reduce workload)	Need for structured training and qualified instructors	Stress management (especially when watched by the instructor) ; risk of learning only specific rules with no generalisation	Start with pedagogical guidance from the instructor towards autonomy ; Start with simple situations and end with the most complex situations ; When the situation becomes too complex, the instructor takes over part of the task
problem-based learning	Students learn about a subject through the experience of	Online or face to face	Small or large groups	Gives meaning to the learning of knowledge ; Deep and lasting learning	The learner must perceive that the group is a plus for him/her ; risk	Training for problem-based learning tutors ; Must	Learning objectives to be worked on autonomously may be not	The tutor concludes the first group session by checking that the action plan for each student is clear to them

	solving an open-ended problem found in trigger material. Employees also get a hands-on experience using machinery, equipment, tools, materials, etc.				that the learning of knowledge is too fuzzy or too contextualised	be cognitively challenging, achievable, not too easy ; Perceived usefulness to the learner	clear at the end of the first group session ; Learners try to answer too early while they do not master the necessary knowledge.	; The tutor explains that the problem situation is only a means to make them acquire knowledge
role play	Requires trainees to assume a character and act out the role in a make-believe scenario or series of scenarios; learning comes by way of reflection on the play	Online or face to face	Small groups (4-15)	First of all, it develops a sense of group and sociability. It improves speaking and activates areas of the brain that are not normally used. Increase self-esteem, self-perception. Secondly, it activates areas of the brain predisposed to memory and creativity.	An obvious risk that can find a foundation is the fact that, in some cases, the RPG can represent a place sometimes distant from the real world. To be properly implemented needs adequate preparation for learners	The practice of using this methodology must be as consistent as possible with the real boundary conditions. Integration with the simulation environment.	stress management (especially when watched by the instructor) ; risk of learning only specific rules with no generalisation	Role explanation, scenario preparation and techniques/approaches to be experimented are learning context-independent. In online settings, a web meeting tool with proper participants management is needed
games-based training	Trainees compete in a series of	Online or face to face	Individual or small	Cost optimization, faster training,	Excessive use of the transposition	Right balance, in the training	stress management (especially	Virtual laboratories.

	decision-making tasks which allows them to explore a variety of strategic alternatives and experience the consequences which affect the other players, but without risk to the individuals or the organization.		groups (4-15)	reduction in response times to change, autonomy in learning, constant monitoring of progress, likely increase of knowledge retention.	of a real problem as a game can, in the long run, lead to the loss of the decision-making complexity on the reality.	process, between simulation and reality	when watched by the instructor) ; risk of learning only specific rules with no generalisation	
team-training	Intended exclusively for groups of individuals that behave interactively, to either improve mutual knowledge within a team or to train the team on a team-specific skill	Online or face to face	Small or large groups	Improvement of the average level of knowledge of the classroom/team.	Flattening of the level of knowledge with the risk of "losing" both the peculiarities and excellence and the lesser abilities of individuals.	Right balance from group activities and individual learning, through the use of both group and individual exercises and tests.	Analysis and evaluations to verify the level of group and individual learning	Interactive exercises, group and individual questions and tests. Syncronous (interactive classes) and asynchronous (forum, Q&A, wikis, shared docs) tools

Table 11. Instructional methods currently used by training providers and their advantages and risks.

7 Education and Training in VET: an evidence-based approach

This section will report summaries of important books written by researchers in the field of training and instruction. These references come from discussions with SMEs and from a book review. The SMEs gave important references in the field of training and instruction in general. The book review has been conducted more specifically on the training in VET.

7.1 Evidence-based approach in training and instruction

This section will review findings in the field of education in general but that can be applied while adapted in the field of VET.

7.1.1 Generic findings

John Hattie, Professor of Education, conducted a synthesis of more than 800 meta-analyses encompassing more than 50 000 studies relating to achievement in school-aged students (Hattie, 2009). To our knowledge, this represents the largest collection of evidence-based research into what "actually works" in schools to improve learning. Their objective was to assess the degree of effectiveness of various factors ranging from student, home, school, curricula, teacher and teaching strategies. For the skill-UP project, we focused on teaching strategies. Table 12 presents the effect sizes of the 49 teaching strategies that were reviewed. An effect size provides a common expression of the magnitude of a factor's influence on an outcome variable such as school achievement. An effect size of $d = 1.0$ indicates an increase of one standard deviation on the outcome. Conventions about effect sizes set that an effect size of $d = 0.5$ is of medium size while an effect size of $d = 0.8$ is large (Cohen, 1988). If we limit the results only to medium effect sizes ($d > 0.5$) and to teaching strategies that may be relevant for the skill-UP project, the most effective teaching strategies may be: reciprocal teaching, cooperative learning and peer tutoring (in team-training), providing elaborated content (such as feedback, meta-cognitive and problem solving strategies), using worked examples, asking for building concept maps or presenting interactive videos.

Teaching approaches			
Teaching approach	Effect size (d)	**Teaching approach**	Effect size (d)
Providing formative evaluation	0.90	**Computer assisted instruction**	0.37
Comprehensive interventions for learning disabled students	0.77	**Adjunct aids**	0.37
Reciprocal teaching	0.74	**Frequent/effects of testing**	0.34
Feedback	0.73	**Simulations**	0.33
Spaced vs. Mass practice	0.71	**Inductive teaching**	0.33
Meta-cognitive strategies	0.69	**Inquiry based teaching**	0.31
Self-verbalization/self-questioning	0.64	**Homework instruction**	0.29

Problem-solving teaching	0.61	**Programmed**	0.24
Teaching of strategies	0.60	**Special college programs**	0.24
Cooperative vs. Individualistic learning	0.59	**Competitive vs. Individualistic learning**	0.24
Study skills interventions	0.59	**Individualized instruction**	0.23
Direct Instruction	0.59	**Teaching test taking**	0.22
Mastery learning	0.58	**Visual/audio-visual methods**	0.22
Worked examples	0.57	**Comprehensive teaching reforms**	0.22
Concept mapping	0.57	**Aptitude/treatment interactions**	0.19
Goals	0.56	**Learning hierarchies**	0.19
Peer tutoring	0.55	**Co-/team teaching**	0.19
Cooperative vs. Competitive learning	0.54	**Web-based learning**	0.18
Keller's PIS	0.53	**Teacher immediacy**	0.16
Interactive video methods	0.52	**Home-school programs**	0.16
Questioning	0.46	**Problem-based learning**	0.15
Behavioral organizers/Adjunct questions	0.41	**Mentoring**	0.15
Matching style of learning	0.41	**Distance Education**	0.09
Cooperative learning	0.41	**Student control over learning**	0.04
Time on Task	0.38	-	-

Table 12. Effect sizes (*d*) of the 49 teaching approaches in Hattie (2009)'s meta-analysis presented in descending order.

7.1.2 A focus on computer-games in training

As computer games are more and more used in education and training, we present recent evidence-based findings for this specific instructional method based on Mayer (2014, 2019). "Games for learning may be defined as games with specific learning goals" (Plass et al., 2020, p.3). Games are characterised by several elements: they are rule based, following clearly defined rules of play; they are responsive, enabling player actions and providing system feedback and responses; they are challenging, often including an element of chance; the progress within a game is usually cumulative,

reflecting previous actions; and finally, games are inviting, motivating the player to engage (Mayer, 2014). Mayer (2014) reviewed research studies on computer games for learning. He focused specifically on one question that could be relevant for the skill-UP project: Which game features improve learning? Table 13 provides a summary of findings regarding this question.

Which game features improve learning?			
Feature	**Description**	**Number of studies (K)**	**Effect size (*d*)**
Modality	Present words in spoken form	9	1.41
Personalization	Use conversational style	8	1.54
Pretraining	Provide pregame experience	7	0.77
Coaching	Provide advice or explanations	7	0.68
Self-explanation	Provide prompts to explain	6	0.81

Table 13. Effect sizes (*d*) by game feature from Mayer (2014).

7.1.3 A focus on Extended Reality in training

A recent meta-analysis studied the effects of Virtual Realty, Augmented Reality and Mixed Reality (labelled Extended Reality) used as training enhancement compared to traditional instructional techniques (Kaplan et al., 2020). They selected 25 relevant articles and concluded that extended realities were as effective as commonly accepted methods. They studied specifically three types of task categories: cognitive tasks, physical tasks (involving some sort of bodily training) and mixed tasks (combination of both physical and cognitive requirements). Table 14 highlights that training with Extended Reality was more successful on physical tasks than cognitive tasks. However, this finding was not consistent across studies. Indeed, several of the population involved in the studies of the physical tasks were special population such as stroke victims, or Parkinson's disease patients. Thus, further research is needed. However, Kaplan et al. (2020) concluded by stating that the benefit of XR lies in providing training in "situations when danger or cost may make traditional training impossible".

Effect sizes by task type		
Task type	**Number of studies (K)**	**Effect size (*d*)**
Cognitive tasks	9	.01
Mixed tasks	12	-.07
Physical tasks	8	.36

Table 14. Effect sizes (*d*) by task type in Kaplan et al. (2020)'s meta-analysis of effects of extended reality (Virtual Reality, Augmented Reality and Mixed Reality)

7.2 Training in VET (book review)

7.2.1 Introduction

The methodological principles of pedagogy (scenario design, teaching methodologies, pedagogical approaches, assessment designs) are not specific to a single discipline or a single field of teaching. Similar approaches can be found in both traditional post-compulsory education and vocational training. However, some aspects of pedagogy aimed at a VET audience may be specific.

As the literature on learning and pedagogy in VET is very large and diverse, a literature review focusing on books and book chapters was conducted in order to be based on robust findings. This search was conducted using the WordCat online bibliographic database, which was consulted on 24/03/2021. This database was chosen because of its free online access, its ability to reference and index by keywords and subject areas scientific books on a global scale. The search phrase used in the advanced search form combined at least one word from each of the three semantic fields searched (VET, methodology, learning) and excluded those related to pathology. Restrictions have been applied to include only documents published in English over the last 15 years (2006-2021) that have been referenced by the database in the field of education and were not a thesis nor a dissertation. One hundred and twenty documents were thus obtained. A first selection was made by reading the titles, then a second by reading the abstracts and tables of contents when they were available online. The selection criteria were the presence of terms evoking one or more teaching or training methods. The exclusion criteria were documents intended only for people with disabilities or under the age of 16. Four documents were excluded for their format (DVD, umbrella review, paper, conference proceedings). Twelve documents were therefore selected in the end and their list is given in the appendix. Six books were available online (Figure 8). When these books referred to other publications of interest, these were consulted. Relevant information was then reported, with the authors cited.

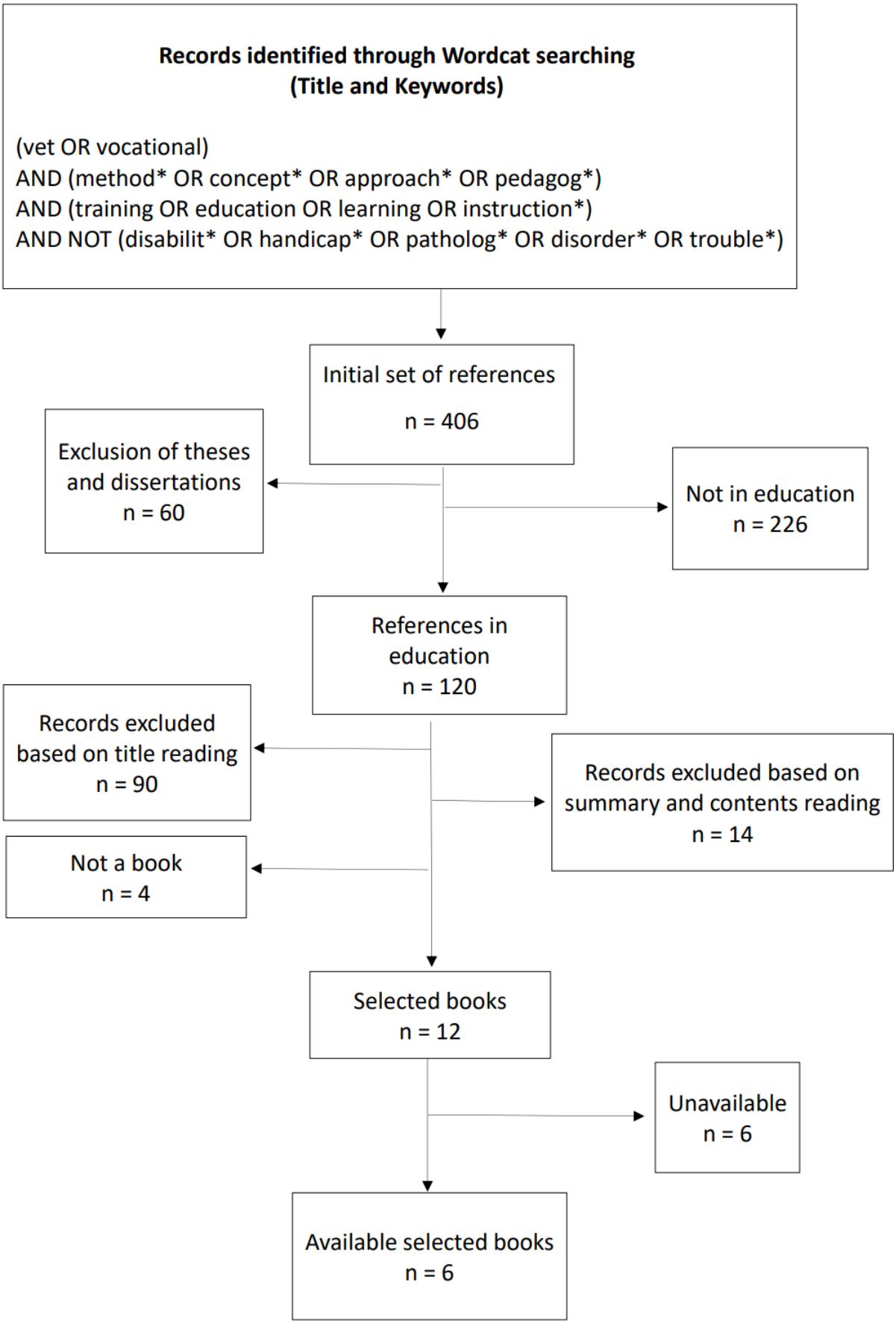

Figure 8. Book flow diagram

7.2.2 Diversity of vocational training

Vocational education and training are related to specific and heterogeneous objectives, resulting in a wide variety of courses, many of which are unique and exclusive (Bines & Watson, 1992; Eraut, 1994). These courses are dominated by the teaching and assessment of practice-based knowledge, the design of which is complex and influenced by requirements external to the training environment (Ellaway, 2007). Moreover, there is a great diversity of vocational education systems between countries: institutions, actors, curriculum, learning standards, certifications, qualifications... (OECD, 2020; Pilz, 2012). For Winterton (2012), the origin of the diversity of education systems can be found in two causes: different vocational education traditions and missions from one country to another. Comparisons are difficult, especially those focused on competences, and no universal definition is possible (Winterton, 2012). Competence is a generic term often interchangeable with competencies.

Globally, vocational education and training are approached according to 3 distinct models. One model is the liberal market economy model, where provision reflects the requirements of the private market (Britain and Australia). A second model is a bureaucratic, state-regulated model, where national education systems define, provide and finance vocational education and training (France, Italy, Sweden and Finland). A final model, the dual system, which relies on strong collaboration between the public and private sectors, with companies funding apprenticeship training and public bodies funding TVET schools (Germany, Austria, Switzerland, Denmark and Norway; Kyobe, 2017). In Western Europe, vocational training systems are based on varying models of competence, but mainly based on occupational requirements. The three main models found by Winterton (2012) are qualification-based for the French model, occupational identity-based for the German model, or workplace functionality-based for the UK model (see Winterton (2012) for a more complete presentation). In a comparison of dual VET systems in Europe, mainly in Switzerland, Austria and Germany, Bauer and Gessler (2017) found systems under state responsibility with shared competence between the state and the economy in Switzerland, but mainly led by the economy in Germany.

This disparity allows for a multitude of practices, which is a richness, but it makes it difficult to conduct international studies involving large-scale assessments, which would provide empirical evidence for the assessment of competences (Pilz, 2012).

7.2.3 Competencies framework and common characteristics in VET

A reference framework of common competences has been established at the European level, using the concept of generic competences. The content of these competences would be transferable from one discipline or trade to another, which would also facilitate their evaluation. This concept led to the establishment of a European Qualifications Framework in 2008, revised in 2017, which aims to make national qualifications more comprehensible and transferable between them. Eight increasing levels of proficiency are described according to the state of knowledge, the ability to apply knowledge ('learning outcomes') and the autonomy of the worker (Official Journal of the European Union, 2017). However, the functional aspect of this concept is criticised, given its very strong dependence on the context in which competences are exercised, including for generic competences. Some generic competences such as critical thinking, problem solving and communication are conceptualised in very heterogeneous ways depending on the fields of activity and the trainers. These competences can be manifested in different ways in different professions (Tynjälä & Gijbels, 2012). These authors cite the case of communication, for example: to communicate in a mechanic's workshop, in a doctor's surgery or in an aircraft cabin, it is not enough to transpose an acquired skill, but rather to master specific and implicit knowledge relating to the professional domain.

Despite the great heterogeneity of vocational training, Ellaway (2007) identifies common characteristics. As a result of their specificities, these vocational courses offer their learners professional outlets, which are also very specific, directly linked to the learning acquired. There is thus a strong dependence on regulations, accreditations, the presence of expert trainers and their requirements, as well as on the learning acquired at the place of practical training or work. Much of vocational education requires the acquisition of practical skills, which are essential to the individual's knowledge base. Among the common learning activities used by different vocational training courses, Ellaway (2007) finds the use of internships, simulators, the use of portfolios and practical skills assessments. Ellaway indicates that these courses also have in common the

modelling of their curricula. The curricula of vocational education and training programmes are extensive and specific to each, subject to numerous adjustments over the years to adapt to educational and professional developments. These necessary adaptations make the programmes difficult to understand for students and difficult to manage for trainers. This explains the frequent creation of pathway maps, oriented towards procedural learning objectives and exit skills expected at the end of the training.

7.2.4 Educational approaches and learning activities in VET

In order to increase young people's chances of employability, Bünning (2007) argues that learners need skills that are flexible and adapted to the current demands of society. For this, they need a combination of knowledge and practical and social skills. They also need to be able to adopt positive attitudes, to think and act independently, creatively and responsibly. Bünning (2007) suggests the use of the learning by doing method, considering it much more appropriate than traditional models that convey a formal and abstract process, with no real link to the specifics of real practice. According to Bünning (2007), this method would accelerate learning and allow difficult situations to be handled more effectively. Learning by doing is a teaching method that uses the performance of a task in a real environment as the main means of learning. In a group context, learners are asked to perform tasks, test hypotheses, explore possibilities. Work-related problems are discussed and reframed in a learning context, allowing the learner to ask questions and reflect to elicit a deeper level of analysis. For Bünning, learning from shared experience provides innovative solutions and helps individuals and organisations to adapt to a rapidly changing world. When integrated into learning activities, this method offers increased opportunities for personal and professional development of the individual. Bünning illustrates this by presenting four learning activities, namely role-playing, problem-based learning, case studies and programmed teaching, which will be presented in section 7.2.5.

Constructivism is a theory of learning based on learning environments. Prior knowledge of learners for the design of pedagogy is taken into account, attention is paid to metacognitive skills and knowledge and collaborative forms of learning are encouraged. The teacher plays the role of a learning facilitator and conducts assessment procedures integrated into the learning process. Learning processes are characterised by active knowledge processing (Tynjälä & Gijbels, 2012). Noting the constant evolution of the professional environment and the ability of experts to solve complex problems enabling them to adapt to changes in the professional environment, Tynjälä & Gijbels (2012) propose to prepare learners to be more in tune with the evolution of the professional environment. For this purpose, they propose a constructivist approach, focusing on the essence of professional expertise. Tynjälä and Gijbels (2012) break down professional expertise into four basic types of knowledge: a) factual, conceptual and theoretical knowledge, b) experiential and practical knowledge, c) regulatory knowledge, such as self-awareness and regulation of activities (metacognition, self-reflection), which allow links between the first two types of knowledge. To this constructivist model, the authors add a fourth type of knowledge, d) socio-cultural knowledge. Socio-cultural knowledge is not personal knowledge, but knowledge of the work environment (creating a dependency on the work context, which is a common feature of vocational training and by definition precludes the concept of generic competences seen earlier). The integration of socio-cultural knowledge in constructivist learning environments constitutes for the authors a model of integrative pedagogy. For Tynjälä and Gijbels (2012), professional expertise is thus made up of these four interrelated types of knowledge. Therefore, the training to be provided to learners to develop their expertise capacity will also be dependent on these four types of knowledge (factual, practical, regulatory and socio-cultural). In this model, the use of a necessary link between theoretical and practical knowledge is achieved through reflection, using tools such as discussions (with a tutor or in small groups), written work such as analytical tasks, portfolios and self-assessment tasks. These activities allow students to develop their self-regulation skills in a context specific to their field of knowledge. Subjecting learners to problem-solving tasks or guided work experience forces them to face practical, theoretical and self-regulatory challenges. In this sense, problem-solving tasks should be, for Tynjälä and Gijbels (2012), the core of vocational training. Socio-cultural knowledge is not individual, but shared by workers in a professional context. In order to achieve the integration of this 4th type of knowledge, it is necessary to involve learners in communities of practice, either by allowing them authentic practice in the form of internships or simulations.

Hattie (2009) produced a synthesis of over 800 meta-analyses, presented above. Although this synthesis is not specifically oriented towards vocational education (secondary school audience), some elements of this analysis are provided. This choice was made because it covers the field of

pedagogy over a period of 25 years and provides an objective assessment of the effect sizes of the various factors contributing to student learning. Hattie classified and evaluated the effects of six classes of factors on student learning (the student, the home, the school, the school career, the teacher and the teaching approaches). The author repeatedly points out that the most important factor in the progress of a class over the course of a year is the teacher, and the most important aspects contributed by the teacher are his teaching skills and relationship with the students. Hattie states that "it is less the 'methods' per se than the principles of effective teaching and learning that matter."(Hattie, 2009, p.245).

7.2.5 Different learning activities in VET

This review of VET books mentions many learning activities and a list of which is given below. For those activities, not listed in Table 11, a brief presentation will be made and the concordances between the two approaches (feedback and literature) will be mentioned where appropriate.

7.2.5.1 Problem-based learning

This activity is frequently cited in VET education by partners and in the literature. The evolution of this activity is project-based learning, which is a more complex activity, taking place over a longer period of time, in order to carry out the project in a realistic scenario, corresponding to professional practice. Students have to identify and define the learning objectives necessary for the realisation of the project, to use different methods and work instruments, to develop their autonomy, work organisation and time management skills (Bünning, 2007; Tynjälä & Gijbels, 2012).

With regard to teacher training for both activities (problem/project-based learning) the partners indicate the need for training in this method and Bünning et al (2006) note the importance of having professional, workplace-specific skills. Thus, the teacher can have a role as a learning facilitator.

Assessment of this type of activity needs to be approached carefully in line with learning objectives and teaching practice. A misuse of this practice could be to carry out a traditional assessment of knowledge by attempting to measure theoretical and factual knowledge. This could lead to false learning failures (Tynjälä & Gijbels, 2012). Among meta-analyses of problem-based learning, Hattie (2009) finds limited or even negative effects on the assessment of superficial knowledge and positive effects on deep knowledge. For example, Dochy et al (2003), cited by Hattie (2009), found an overall negative effect of problem-based learning compared to a conventional learning environment for knowledge (d = -0.78), but a positive effect on skills (d = 0.66). The assessment of surface knowledge seems to be the main mode of assessment in problem-based learning studies. This could explain the small overall effect size found by Hattie (2009) for this type of activity (d=0.19). He suggests that it is the application and understanding of knowledge, rather than concepts or knowledge development, that is at the heart of problem-based learning.

7.2.5.2 Internship

Conducting an internship is a common activity in a large number of vocational training courses (Ellaway, 2007). This learning activity allows the learner to acquire knowledge, but also its application, in a context as close as possible to the real world, leading to the acquisition of explicit competences. The learner is immersed in a working context that incorporates the culture and working methods of the discipline, thus acquiring implicit knowledge of the field of practice (Ellaway, 2007). As the immersion is also carried out within the group of workers present in the field of practice, the learner also constitutes implicit knowledge, specific to the place of practice and to the professional organisation (team, company, institution...) (Ellaway, 2007). This learning activity thus enables certain expected professional requirements to be met, which is the basis of the European competence models of vocational training described by Winterton (2012).

7.2.5.3 Portfolio

The portfolio is a document that brings together a set of elements relating to a person's training, such as the mapping of the study programme, the training objectives, the results of progress tests, reports and analyses produced, and the monitoring and validation of periods of training. For Ellaway (2007) this tool is often integrated into the design of vocational education and training teaching and assessment. It is an important element in the learning process. One advantage is that it can be used to bring together documents that are useful for monitoring initial training, but also throughout the individual's life. Thus, an individual can compile and then justify exposure to professional situations, recognition by referees of acquired professional skills, a level or duration of practice. These elements can be used as proof of a level of experience or be required to claim (re)accreditation. The possibility of storing this type of document online also makes it easier to keep and make these training elements accessible to different stakeholders.

7.2.5.4 Case study

This activity, cited by partners (Table 11), according to Bünning (2007) can be carried out in three phases. The first phase is initially individual, with each student having to analyse the context, discern the issues and then search for relevant information. The second phase is problem solving and is done collectively (several groups). Learners evaluate different possible solutions and make a decision based on arguments. The third and final phase is a critique of the solutions proposed by the groups. By comparing and discussing the different existing and chosen solutions, realistic evaluations can be made (Bünning, 2007).

This methodological framework can, however, be adapted according to the objectives of the work. The objective of the activity can be oriented towards analysis (observing a case with an analysis according to different focuses), towards decision-making (best possible decision, decision made in a hurry) or towards identifying and finding missing information.

7.2.5.5 Programmed instruction

It is a teaching procedure in which learners work individually and have to deal with practical exercises, for which they receive instructions in the form of written documents. These instructions consist of guiding questions, a work plan, advice on suitable materials for acquiring new knowledge, a checklist and a guiding theme. At the end of the assignment, the learner is required to carry out a self-assessment before presenting their analysis to their teacher.

The aim is to enable learners to perceive the learning and working processes to be autonomous when they are in the operational field. The learning of autonomy, planning of working time and self-assessment are made possible by the support provided by the programmed instructions. The teacher helps the learners by formulating questions (Bünning, 2007).

7.2.5.6 Role play

Role-playing is an activity described in Table 11. According to Bünning (2007) this activity helps to develop planning and organisational skills. The realisation of the scenario leads to proposed solutions for a situation. At the end of the exercise, the discussions of the whole group, between ‘actors’ and ‘observers’, allow new knowledge to be gained. The role-play can be concluded with a summary and extension, providing an overall perception of the experience.

7.2.5.7 Formative evaluation

Formative assessment is one of the possible techniques to increase the feedback of the work done by the learners. This activity has a "learning aid" function in the instructor-learner relationship, which involves them in a process of exchange, allowing for the feedback necessary for the consolidation of learning. There is a notion of progression in formative assessment and it is essential to use the notion of a developmental journey or pathway (Scallon, 2015), in order to form an informed practice of formative assessment.

The Berkeley Evaluation and Assessment Research (BEAR) Center has developed an assessment system called the BEAR Assessment System (BAS), initially deployed for science assessment and with potential for deployment in higher education (Wilson, 2005; Wilson & Draney, 2013; Wilson & Scalise, 2006; Wilson & Sloane, 2000). Regarding the process of constructing assessment items, Wilson and Draney (2013) indicate that a particularly effective mode of assessment is that of evaluating students' progress and performance by integrating it into the teaching and learning process, making it almost indistinguishable from everyday teaching activities. For this purpose, they recommend the use, as for pedagogical tasks, of a variety of assessment tasks. (individual, group, MCQ, data processing, reading question...).

In his meta-analysis evaluating learning effectiveness factors, Hattie (2009) found formative assessment programmes in 3rd position, all methods combined (d = 0.90). These formative assessments have an effect both on students as an evaluation of their performance and on teachers, who can thus measure the effects of their methods on student learning.

8 Considerations for the design of a training module

This section will be composed of relevant questions that training designers should ask themselves before beginning the design of the training module, independently from the choice of the instructional method. A focus will also be made on some common “urban myths” in education that may still be found in training organisations.

8.1 Relevant questions

8.1.1 Learning objective

The first question is to list the learning objectives of the training module. Anderson and Krathwohl (2001) revised Bloom’s taxonomy and provided a framework that is still widely used in instructional design. First, they propose six categories of student cognitive processes that are included in the learning objectives:

1) Remember: retrieve relevant knowledge from long-term memory
2) Understand: construct meaning from instructional messages, including oral, written and graphic communication
3) Apply: carry out or use a procedure in a given situation
4) Analyse: break material into constituent parts and determine how parts relate to one another and to an overall structure or purpose
5) Evaluate: make judgments based on criteria and standards
6) Create: put elements together to form a coherent or functional whole, reorganize elements into a new pattern or structure

Each of these six major categories are associated with two or more specific cognitive processes (see Table 15).

Categories of cognitive processes		
Process category	**Specific cognitive processes**	**Examples**
Remember	Recognising	Recognise the dates of important events...
	Recalling	Recall the dates of important events...
Understand	Interpreting	Paraphrase important documents
	Exemplifying	Give examples of various...
	Classifying	Classify observed cases...
	Summarizing	Write a short summary of...
	Infering	Infer grammatical principles from examples
	Comparing	Compare historical events to...
	Explaining	Explain the causes of important events
Apply	Executing	Divide one whole number by another one
	Implementing	Determine in which situations this law is appropriate
Analyse	Differentiating	Distinguish between relevant and irrelevant numbers...
	Organizing	Structure evidence into evidence for and against...
	Attributing	Determine the point of view of the author...
Evaluate	Checking	Determine whether conclusions follow from data
	Critiquing	Judge which of two methods is the best to ...
Create	Generating	Generate hypotheses to account for a phenomenon
	Planning	Plan a research paper on a given historical topic
	Producing	Build habitats for certains species for certain purposes

Table 15. Cognitive processes from Anderson and Krathwohl (2001)'s taxonomy.

8.1.2 Type of knowledge

Besides from cognitive processes, Anderson and Krathwohl (2001) identified also four categories of knowledge that could be targeted by the learning objective:

1) Factual knowledge: the basic element students must know to be acquainted with a discipline or solve problems in it
2) Conceptual knowledge: the interrelationships among the basic elements within a larger structure that enable them to function together
3) Procedural knowledge: how to do something, methods of inquiry, and criteria for using skills, algorithms, techniques and methods
4) Metacognitive knowledge: knowledge of cognition in general as well as awareness and knowledge of one's own cognition

Thus, the second question concerns the type of knowledge targeted by the training module.

8.1.3 "Ten steps" of instructional design

Van Merriënboer provides an important model of instructional design for complex learning (van Merriënboer & Kirschner, 2017). This model can be summarized in ten design activities, the "ten steps to complex learning":

- Design learning tasks
- Design performance assessments
- Sequence learning tasks
- Design supportive information
- Analyse cognitive strategies
- Analyse mental aspects
- Design procedural information
- Analyse cognitive rules
- Analyse prerequisite knowledge
- Design part-task practice

This model can serve as a basis for the design of training modules. A summary of each step is provided below.

The first step is to design learning tasks. The idea is to use real-world tasks as basis for designing the learning tasks. Learners may perform these tasks in simulated task environments ranging from low to high fidelity. A general finding is that for effective learning of complex skills, the psychological is initially more important than its physical fidelity (McGaghie et al., 2010). Moreover, high-fidelity task environments may even be detrimental for novice learners because they provide too many 'seductive details' or overabundant information that may distract the learner. Van Merriënboer and Kirschner (2017) insist also on the importance of the variability of practice in order to achieve transfer of learning.

The second step aims to carry out performance assessments. Objectives to be achieved must be set, in relation to the learning tasks identified. These performance objectives should be precisely characterised (Mager, 1997). Unlike pedagogical approaches that define the method in terms of a goal to be achieved, according to the Ten Steps model in complex learning, it is precisely the integration and coordination of the constituent competences described by the performance objectives that must be supported by the training programme. The design is therefore based directly on the characteristics of the learning tasks and the results of the task analysis (and not on the separate objectives).

The third step is to sequence the learning tasks, in order to classify them by complexity, thus forming task classes. Van Merriënboer and Kirschner (2017) strongly recommend a whole-task sequencing approach to allow learners to quickly get an overview of the skill, which will be progressively enriched during the training.

The fourth step aims to create information. By providing supportive information, modelling examples, cognitive feedback, learners will be able to build bridges between what they already know, what is already stored in their memory, and what they need to know, to work successfully.

The fifth step should only be carried out if supporting information is not available to the learners. It consists of the analysis of learners' cognitive strategies for dealing with unfamiliar aspects of new tasks. The result of these analyses will be used as a basis for the design of supportive information, in particular systematic approaches to problem solving (SAP).

If the information needed to perform a task class is not available, Van Merriënboer and Kirschner (2017) recommend performing mental model analysis. Mental models help performers to understand a task domain, to reason about it, to give explanations and to make predictions (Van Merriën- boer, Seel, & Kirschner, 2002). The sixth step is to determine the mental models used by domain competent performers to perform the non-routine aspects of tasks. This helps to identify what learners need to know to succeed in the non-routine aspects of the tasks and thus to develop the necessary support strategies to guide them along the problem-solving path.

The seventh step is one of the four main design components and aims to design the procedural information that will enable learners to perform the recurrent aspects of a complex skill. The execution of these recurrent tasks can be done in a fully automated way, without the need for conscious control, after intensive training.

The eighth step is, if this information is not available, to analyse the cognitive rules that are at play in the recurrent aspects of new tasks. These cognitive rules are of the "IF-THEN" type. They specify how competent task performers carry out aspects of real-life tasks that are identical from task to task and problem to problem. Identifying these rules will help to identify the prerequisites that need to be mastered by learners, as well as the design of some of the procedural information and possibly part-task practice.

The ninth step consists in analysing prerequisite knowledge, i.e. the knowledge (concepts, principles or plans) the learner needs to know in order to correctly perform the recurrent aspects of a complex task. This step has to be done only if the procedural information is not yet specified in existing material such as job aids or instructional material.

The tenth step aims to design part-task practice. This step is only necessary if additional practice of recurrent aspects of the skill is necessary to reach a high level of automaticity, or for skills requiring high levels of speed and accuracy. Van Merrienboër and Kirschner (2017, p.253) highlighted that “in general, an overreliance on part-task practice is not helpful for complex learning.” At this step, practice items should incite learners to perform the recurrent constituent skill repeatedly. This will be typically performed in a simplified environment and van Merrienboër and Kirschner (2017) recommend to favour “conventional practice items” where learners have to produce the answer directly or to execute a sequence of actions (as opposed to “edit items” or “recognize items”).

8.2 “Urban myths” in Education

De Bruyckere, Kirschner and Hulshof (2015) reviewed several theories and applications in education that are not correct, need to be nuanced or are unproven. They listed 12 myths about learning. We selected eight of them that could be relevant for VET training and provided a summary of findings.

8.2.1 Myth 1: People have different styles of learning

There is the intuition that there are people who prefer to learn visually, while others prefer to learn auditively and others kinesthetically. However, there are two problems with this intuition. Firstly, the way that someone says he/she prefers to learn is not necessarily linked to better learning. Indeed, a meta-analysis of studies using learner preference for selecting specific instructional methods found no correlation or negative correlations with learning outcomes (Clarke, 1982). Secondly, the concept of learning styles itself is questionable. Actually, the assumption that people may be categorized following their learning style received very little support from objective studies (e.g., Druckman & Porter, 1991).

8.2.2 Myth 2: The effectiveness of learning can be shown in a pyramid

The learning pyramid (see Figure 9) is often used in various forms in VET courses. However, there are two problems with this pyramid. Firstly, its origins are rather unclear (Molenda, 2004; Subramony et al., 2014). Secondly, the percentages are impossible to verify without specifying the age of the learners, the type of learning task and the content being remembered but also prior knowledge of the learner, activities employed during the lecture or while reading, and so on. Lalley and Miller (2007) covered most of the problems with the learning pyramid, including the pyramid’s overlapping of media (for instance, watching a video might combine text, lecture, pictures) as well as the lack of research and rigor of the research that has been carried out.

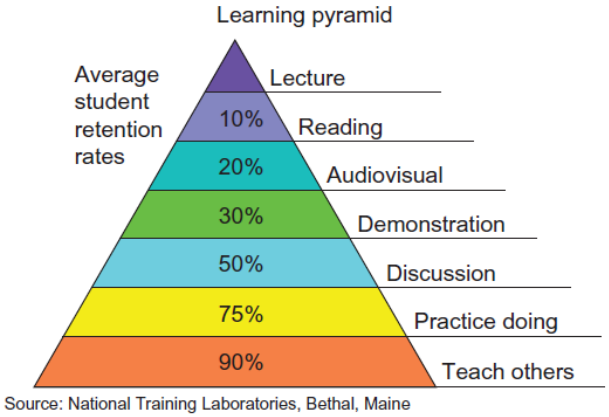

Figure 9. The learning pyramid : another myth in education

8.2.3 Myth 3: You learn 70% informally, 20% from others and just 10% through formal education

In occupational training reference is often made to the 70-20-10 rule. This rule states that one learns 70% based on experience, 20% through interaction with others and 10% through classic training courses. However, the source of this rule comes from training in leadership of executives. Moreover, no evidence to support this rule has been found in the professional literature (De Bruyckere et al., 2015, p.37).

8.2.4 Myth 4: If you can look everything up, is knowledge so important?

As knowledge is easily accessible through Internet, it may seem useless to teach learners to acquire factual knowledge. However, our prior knowledge and experiences determine how we interpret the world and how successfully we search for information (De Bruyckere et al., 2015, p.39). Many researchers (e.g., MaKinster, Beghetto, & Plucker, 2002) have demonstrated that even adults cannot effectively choose good search terms, combine them properly, select relevant websites, and question the validity of the sources retrieved. Therefore, we actually need more knowledge to learn and apply the skills we need.

8.2.5 Myth 5: Knowledge is as perishable as fresh fish

Knowledge seems to be more and more rapidly obsolete. However, firstly, knowledge obsolescence has to be distinguished from information growth. Secondly, much of what has passed for knowledge in previous generations is still valid and useful.

8.2.6 Myth 6: You learn better if you discover things for yourself rather than having them explained to you by others

“Discovery learning” or “self-discovery” or “active learning” is a very popular theme. Meta-analyses on this subject reveal a clear positive learning effect. However, it should be nuanced. Indeed, inquiry can be effective with the right guidance and support. The more novice the learner is, he more important support and guidance are.

8.2.7 Myth 7: You learn effectively through problem-based education

In problem-based learning, the students work usually in small groups with the aim of completing a learning task under the guidance of a teacher, with alternation of group discussions and self-study. Nevertheless, research shows that in practice it is not suitable for acquiring new knowledge (De

Bruyckere et al., 2015, p.56). Problem-based learning is more adapted to apply previously acquired knowledge to a new problem.

8.2.8 Myth 8: 93% of our communication is non-verbal

The origin of this myth comes from Mehrabian (1972, 1981) who investigated how people communicate their emotions. He found that, when dealing with communications of attitudes and feelings, what gives meaning is: the words you use (7%), the intonation (38%) and your body language (55%). Nonetheless, Mehrabian himself stated that it was wrong to say that 93% of all forms of communication is non-verbal.

8.2.9 Summary of effective methods

De Bruyckere et al. (2015) also gave a summary of the methods for which scientific evidence of their effectiveness exists, which are in line with Hattie (2009):

- Crucial role of feedback
- Importance of deep processing and emotions (in order to foster remembering)
- Providing concrete examples (importance of storytelling)
- Giving variety and surprise
- Including enough breaks

8.3 Merrill's principles of instruction

David Merrill is an education researcher specialized in instructional design. He wrote an influential book describing five important principles to help instructional designers to develop instructional material that will render the instruction more effective (Merrill, 2013). Following are concise descriptions of each of these principles:

1) *Problem-centered*: learning is promoted when learners acquire skills in the context of real-world problems
2) *Activation*: learning is promoted when learners activate existing knowledge and skill as a foundation for new skills
3) *Demonstration*: learning is promoted when learners observe a demonstration of the skill to be learnt
4) *Application*: learning is promoted when learners apply their newly acquired skill to solve problems
5) *Integration*: learning is promoted when learners reflect on, discuss, and defend their newly acquired skill

9 Next steps

Task 3.1 (quality standards guide) associated with task 3.2 (methodologies used in education and training) constitute deliverable 3.1 of the SkillUp project. The information provided in this deliverable aims at proposing to the project partners concrete and argued elements to design training modules (T3.3) and their implementation (T3.4) in the respect of quality standards in VET for each of the countries concerned.

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10 Appendices

Appendix 1 Book review references

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