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REFRAME
REGIONAL NETWORK FOR WORK BASED LEARNING
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DELIVERABLE D3.3.
How to implement REFRAME approach
(Handbook)

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INTRODUCTION, EXPECTED CONTRIBUTION OF REFRAME PROJECT TO THE GROWTH OF QUALITY IN WORK BASED LEARNING

The assumption behind Reframe project is that a well-functioning work based learning path can simultaneously help to meet enterprise skills needs and ease the transition from education and training into employment. Reframe also assume that there is a strong need to develop the quality of work based learning through the implementation of fully integrated curricula learning outcomes oriented which matches the expectation of students and labour market needs. Therefore, Reframe approach to work based learning is aimed in particular to assist and guide vet provider and companies, involved in curriculum development and implementation, to adopt a learning outcomes approach, fully integrated into curriculum. It introduces an innovative match service to enhance collaboration between all the actors and guidelines for the macro design, monitor and evaluation of work based learning paths. The approach is also intended to support the transnational dimension of work based learning trough the identification of a set of unit of competences and learning outcomes with reference to the qualification of Mechatronic Technician EQF 4.

Therefore, among the main criteria identified by Cedefop to support the development of dual VET, Reframe focuses on quality assurance and involvement of the various actors.

WORK BASED LEARNING, KEY CONCEPTS

The Riga Conclusion¹ stresses that there is an increased need to promote work based learning (henceforth, WBL) in all its forms (apprenticeship included) by involving social partners, companies, chambers and VET providers, as well as by stimulating innovation and entrepreneurship.

WBL is an educational strategy that provides students with real-life work experiences through partnerships with schools, vet-providers and companies where they can apply academic and technical skills and develop employability skills.

One essential aspect of the WBL experience is to place the student in a real-work setting.

The activity realized within the working contexts by students provides many advantages from different perspectives:

1. It facilitates the guidance enabling each student, through concrete experiences directly on the workplace, to identify the inner attitudes, for the forthcoming educational and professional choices
2. It offers the possibility to progressively gain professional competences
3. It fosters the integration of the student in an organizational context, such as the working place, and the development of critical thinking and problem solving skills.
4. It is the prerequisite for the acknowledgement of credits for their school career and for entering into the working world.

Work-based learning (WBL) is an umbrella term, which describes a set of learning programmes that include apprenticeships, traineeships and internships. WBL can be defined as acquisition of knowledge and skills through carrying out – and reflecting on –tasks in a vocational context in either the workplace or a VET institution.

The European Commission² clearly demarcates WBL as:

- **Apprenticeships:** Apprenticeships formally combine and alternate company-based training (periods of practical work experience at a workplace) with school-based education (periods of theoretical/ practical education followed in a school or training centre), and lead to nationally recognised qualification upon successful completion. Most often, there is a contractual relationship between the employer and the apprentice, with the apprentice being paid for his/her work. The term apprenticeships is defined and understood differently in many countries and for research purposes.
- **School-based VET with on-the-job-training:** This second form of WBL includes on the-job training periods in companies. These periods vary in length and typically cover shorter internships, work

¹European Commission / Latvian Presidency (2015), Riga Conclusions 2015.

WBL initiatives and policy responses are also part of wider initiatives at EU level aimed at improving education and training, youth employment, and social inclusion, such as the EU Agenda for job growth, fairness and democratic change, the Youth Employment Package, and the broader European Union Youth Strategy (2010 – 2018).

²See: European Commission (2013). Work-based Learning in Europe – Practices and Policy Pointers, p. 5; European Commission (2015). Good for Youth Good for

placements or traineeships that are incorporated as a compulsory or optional element of VET programmes leading to formal qualifications.

- **Work-based learning in school:** WBL can also be integrated in a school-based programme through on-site labs, workshops, kitchens, restaurants, junior or practice firms, simulations or real business/industry project assignments. The aim is to create 'real life' work environments, establish contacts and/or cooperation with real companies or clients, and develop entrepreneurship competences.

For the purpose of Reframe project, the following general definition was agreed between partners:

"School-based VET with on-the-job-training in companies

Periods vary in length and typically cover shorter internships, work placements or traineeships that are incorporated as a compulsory or optional element of VET programmes leading to formal qualifications. Work based learning joins theory and practice and links education and training through knowledge and experience" The WBL element has to be planned as a part of an entire study program.

REFRAME QUALITY APPROACH TO WORK BASED LEARNING IN VOCATIONAL EDUCATION AND TRAINING

In order to provide a contribution to quality approaches within work based learning, the team of the project analysed the existing experiences as well as the European literature and the main conclusion in the existing studies is that the link between the world of education and training and the world of work is of paramount importance for Vet quality and attractiveness. Vet business cooperation covers a broad variety of topics and dimension:

- 1 the Vet process (curriculum development; Vet delivery, feedback loop)
- 2 the topics of cooperation (matching supply and demand, work – based learning, digital skills, innovation, entrepreneurial skills, Mobility, social inclusion raising awareness)
- 3 the level of cooperation (individual, local/regional, sectoral, national, European, global)

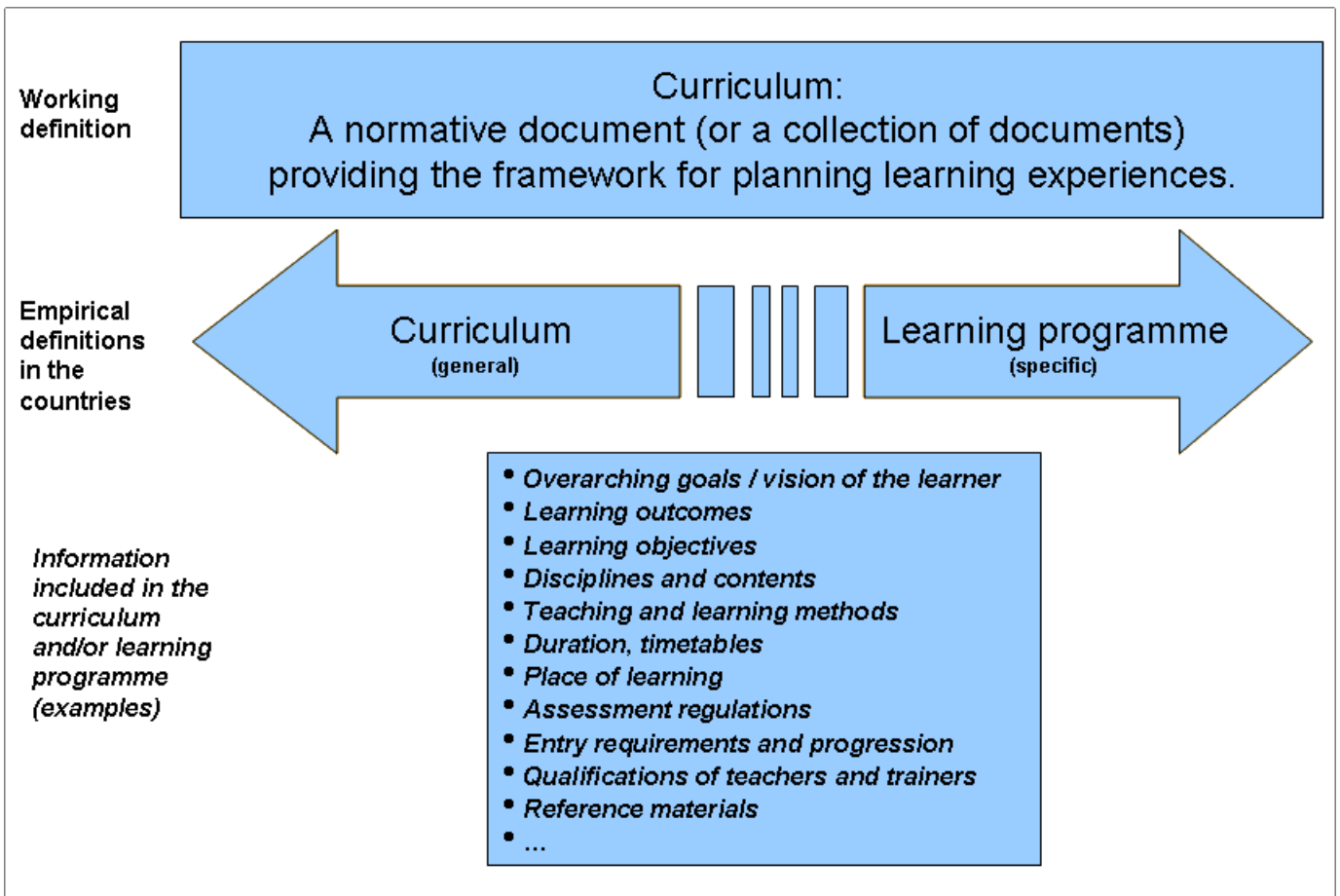
Within this classification the partnership focused on the **topics of cooperation** and in particular on the **methodological framework to be adopted in order to design, implement and evaluate a dual learning path fully integrated** within technical/vocational education curriculum (EQF levels 4), introducing a matching supply and demand service to ease the collaboration between the education and business since the beginning of the process.

the **Reframe platform**, that represents the starting point of collaboration between Vet providers and companies; it focuses on learning outcomes based curricula in order to empower learners by giving them the opportunity to shape their learning process and build individual learning paths and to provide a common language allowing education and training as well as the labour market to speak the same language.

It assumes that a well-designed dual learning programme may increase the quality and relevance of the experience by allowing the alignment and balance of the goals of vet provider **with the interest of the labour market and the expectation of the students**.

It is important that a serious effort is done both in the study of the curriculum and in the design phase of the learning programme by vet providers, both at the very beginning of the process by the three actors involved: the school/VET provider, the host company/organisation, the student. This effort is required to understand expectations, concerns, constraints and opportunities as perceived by all three “parties”.

It is useful to underline the difference between curriculum and learning programme (Cedefop 2008). The term curriculum refers to a normative document setting the design, organisation and planning of learning activities, it is binding for all training providers who wants to use it, therefore it must be general in the sense that is applicable to a variety of places and learners. while the term learning programme refers to the implementation of these activities, it is a written document planning learning experiences in a specific setting. It is developed on the basis of the curriculum and takes into account the learners needs. It is the latter that concerns Reframe approach.



QUALITY CORE PRINCIPLES

The intention of this “framework for design” is to identify and propose a limited set of quality principles and steps –that can be taken as a starting reference for all countries and situations; they constitute the nucleus of the approach and they encourage the actual people involved in the design of Dual Learning paths in VET to customise these core elements according to the country(ies) in which the DL has to be conducted (keeping in mind the national contexts in terms of culture, legislation, economic structure, etc.) and the further elements of specificity deriving from the aims of “that” DL programme, the characteristics of the curricula, the workplaces involved, the specific sector and qualification profiles.

The implication of this method is that, while starting from a common core of quality principles, each DL programme will match the specific conditions that allow a successful and sustainable implementation. Proposing a single European “operationalised model” for Dual Learning in VET would not work because VET systems are not homogeneous across Member States due to different legislation and regulations as well as economic, social and cultural factors. Dual Learning systems are built on the innovative effort of many actors and on particular conditions.

As any other “social innovation”, they are context-dependent and cannot be transferred from one country to another. That is why this approach does not propose a one-size-fits-all approach but a methodological framework that, when applied and adapted to the specific conditions, may help to avoid typical mistakes of “standard-based” policy approaches to DL or other forms of WBL, and to establish a collaborative process of quality design among the actors involved:

The Quality core principles of the REFRAME framework are the following:

1. Learning programme development: Integration of dual learning in outcome oriented curricula
2. Feasibility analysis of the learning programme.
3. Reaching shared awareness of Dual Learning aims and Learning Outcomes at the beginning of the process, Reframe platform.
4. Collaboration in all phases between VET provider, employer and student
5. Professional development of teachers, trainers and tutor

The following pages illustrate: how to apply these basic principles by suggesting main steps and activities to follow in order to design, implement, monitor and evaluate a dual learning programme.

Learning programme development this activity aims to involve teachers and trainers in the analysis of curricula learning outcomes oriented. Curricula are not just a list of subjects to teach. They guide and are central to the quality of teaching and learning; they are fundamental to improving human capital and motivating people to stay in education and training. *VET curricula defined in terms of learning outcomes are “the sine qua non” condition for the design of dual learning pathways.* Curricula need to be implemented through learning programmes in such a way, that the periods of training in companies are integrated in the best suitable way into the program. So, the leading idea is not to add a bit of practical learning to the “normal” curriculum, but to well design and coordinate theoretical and practical learning and to combine the learning places, learning concepts and learning methods, so that the needed competences and skills can be developed optimally.

It must be guaranteed that the level of integration between classroom-based and work-based learning is high enough to constitute a real educational project and not just the sequence of unrelated learning episodes. Implemented outcome- oriented curricula expects well-trained teachers who apply appropriate pedagogic practice and appropriate attitudes to bring about curriculum change. Teachers also have to evaluate whether the expected learning outcomes have been achieved by learners. The Vet provider must proceed with the design or revision of the curricula, defining unit of competences, intended learning outcomes and related learning contexts. **The principle aims to ensure** that outcomes, pedagogy and assessment well match to the interest of employers, vet providers and students; this work must be done taking into account the entire duration of learning course. In the following table, we refer to a five years course for obtaining the qualification of Mechatronic technician, where the dual learning starts at the third year.

A - 1	A	B	C		B	C		B	C	
		3° year			4° year			5° year		
UNITY OF COMPETENCE	LEARNING OUTCOMES <i>described in terms of performance</i>	ACTIVITY	CONTEXT		EXPECTED PERFORMANCE	CONTEXT		EXPECTED PERFORMANCE	CONTEXT	
			School	Company		School	Company		School	Company
atc in the different phases and level of the production process, from the planning to the realization of the project, in relation to his/her area of competence, using design tools, documentation and control	Design, read and interpret the technical drawing and the technical documentation	participation to training courses on the reading of technical drawing, manuals and schemes	X							
		reading of technical drawing and interpretation of	X		reading of technical drawing and interpretation of technical documentation		X	realize, reading and interpret the technical drawing and the technical documentation		X

	technical documentation								
apply the editing techniques and use properly the tooling machines	understanding of assembly and adding techniques	X							
apply the adding techniques on complex components							performing installation and assembly operations of complex components		X
carry out operations for mounting and assembly of components and mechanical systems on the base of the instructions received and the supporting documentation (schema, designs, procedures, bills of materials, etc)	understanding of technical manuals and	X		assemble components and mechanical systems based on the received instructions and supported		X	assemble components and mechanical systems based on the received instructions and supported		X

	technical drawing			documentation			documentation		
verify the availability and conformity of all the components of the single bill of material				control the availability and the conformity of materials and equipment; keeps under control the material in use and provide for provisions		X	control the availability and the conformity of materials and equipment; keeps under control the material in use and provide for provisions		X
record and report of any non-compliances	separation and dealing with non-conforming material according to company	X		check the fundamental mode of operation of the assembly unit			check the fundamental mode of operation of the assembly unit		X

	proce- dures								
verify the conformity and efficiency of the assembly	participation to training courses on ISO 90001	X				X			
deliver of tests for the quality control using sampling plans and the principle misuring tools	dealing with dimensional control on products coming from internal/external	X		control and check of the conformity of the provided materials (or internal components produced) to the specific needs (dimension, surface..) using measuring tools		X	check the fundamental mode of operation of the assembly unit		X
							performing activities of project working in the territorial laboratory	X	



	production lines								
record and report of any non-compliances	separation and dealing with non-conforming material according to company procedures	X							

Feasibility analysis of the learning programme is the process of planning a dual path in the context of a learning programme cannot be separated from a preliminary study of its feasibility involving the three main actors: Vet providers, enterprises, students.

This is the core of the proposed design framework: it is a preliminary analysis of what is desirable and feasible –given the aims and the context-, started by the VET Provider and the company, therefore shared between the two parts and with the targeted student(s). It can be considered as a “macro-design” phase, in which the general frame of the Dual Learning programme is defined.

The following graph “General framing” can be explained as follows:

<i>Learners needs</i>	<i>General Frame of the dual programm: results to be achieved</i>	<i>Educational context</i>	
employability	<i>Learning outcomes identified and issued on the platform</i>	<i>Qualification framework</i>	
personal development		<i>Curricula</i>	
approaching the world of work		<i>Learning programme</i>	
developing social and organisational skills,		<i>Hosting company</i>	<i>Work place environment</i>
specific professional competences		<i>Duration</i>	
	<i>Feasibility Condition</i>		
	<i>Transnational Elements</i>		

On the left side, the learners needs (such as employability, personal development, approaching the world of work, developing social and organisational skills, specific professional and technical competences, overarching the main desired learning outcomes is represented.

The VET provider must clearly define what they should achieve by adding a **WBL component** and present their objectives in terms of learning Outcomes to the identified hosting company: the company must openly declare if these objectives are feasible, and if they are in the conditions to offer something different or something more that is important in their perspective. Reaching agreement on what must and can be achieved is the starting point for a successful experience. This approach is supported by the **Reframe platform** as explained further. Of course, the students have to be consulted on what is the agreed proposal, so that they can have a say by expressing their interest, available competences and finally agreement on the main learning outcomes expected from the WBL component of the programme.

The right side of the graph represents the contextual elements that define the institutional feasibility elements: the level and kind of qualification programme, the existing regulations, the local/transnational availability of WBL opportunities and the resources available to support it, the formal requirements for recognition and funding.

In the centre, the results of this initial phase: intended learning outcomes to be achieved, identification of hosting company, the overall duration of DL against classroom/laboratory activities and the basic structure (e.g. all at the end, alternated every week, in three progressively longer steps of WBL, etc.), the presence of a transnational element; the overall feasibility conditions (available resources, responsibilities for the subsequent implementation phase, main criteria for evaluation, etc.)

Matching service between Vet provider and companies: Reframe platform -Reframe platform represents the starting point of collaboration between Vet providers and companies and it focuses on learning outcomes based curricula. It wants to be a starting tool to create synergies and other collaborations between vet providers and companies for the development of structured paths integrating traditional learning and periods of working practice. The designing of the curricula in terms of learning outcomes allows Vet providers to publish on the Reframe platform their offer in terms of number of students per year, qualification profile, learning outcomes to be acquired in working environment, duration of the experience. Companies, in turn, can respond by confirming their availability and reporting any additional skills that meet the needs of the company.

Therefore, this phase allows to associate companies, students, and co-designing for each a personalized training program with the company. In particular, the CO-Design section represents the heart of the platform and intends to be the concrete tool to create the dual learning path, shared by schools and businesses. **VET providers and companies can register on the website by filling out a registration form.** Through the registration form, schools and businesses can create a dashboard to publish their own training offers.

A company that is interested in an offer from a school can co-design its training course, by first viewing the list of competences that the company is able to offer, and lastly integrating these competences with other additions (if there are any). The result of the co-project is a document that can be downloaded by both parties to sign an agreement on the training course.

Checking awareness and interest of the parties involved While it may appear an unnecessary step to those who believe that policy decisions just have to be implemented, checking the level of awareness, interest and willingness to engage in Dual Learning by the three parties directly involved –students, companies and VET providers- must be considered as the first important feasibility condition, essential to start the whole process. Other stakeholders (legislative and administrative authorities, associations, local stakeholders) may play an important role to facilitate or discourage DL; policy emphasis and financial support may create favourable conditions, especially for SMEs, to start collaborating with VET on DL Programmes.

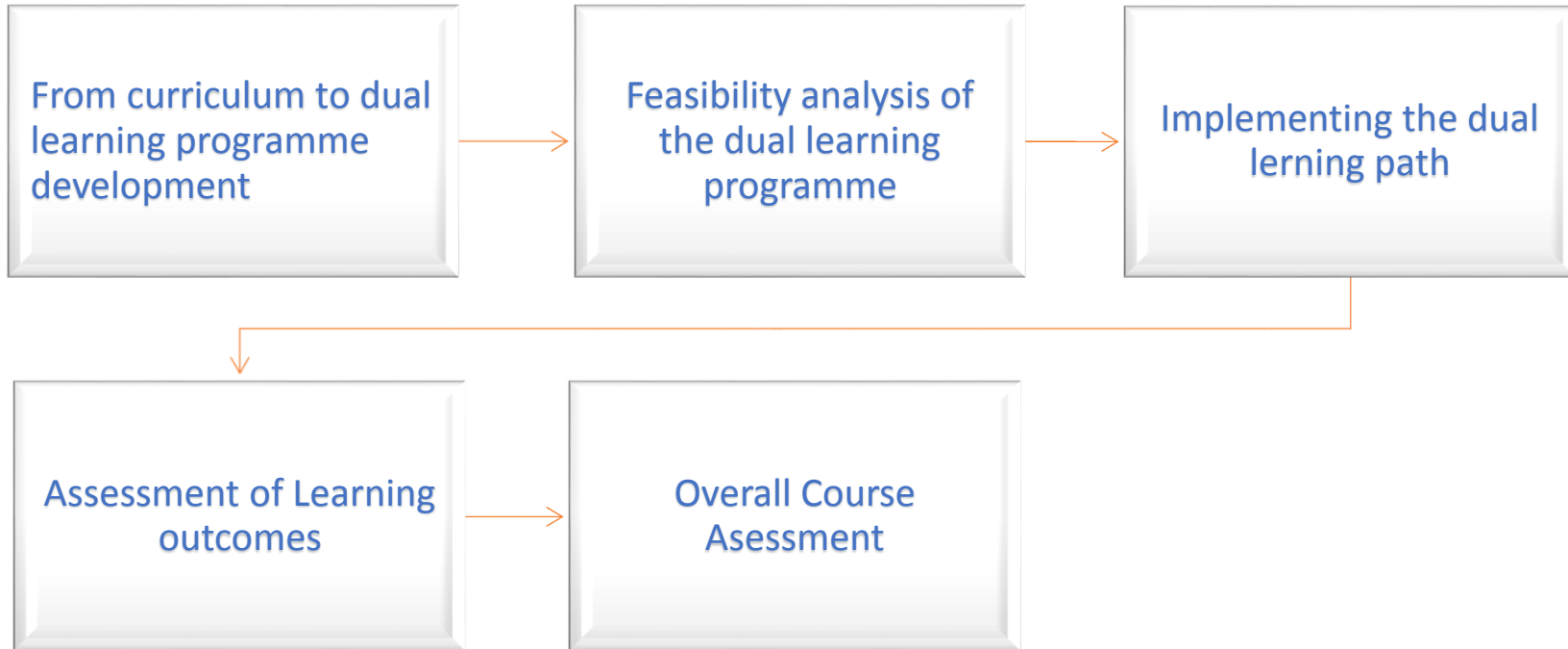
There may be different level of awareness and commitment to take part in DL by the different parties may differ at the beginning of the interaction; for example the VET provider might have a high level of motivation to implement policy directives, but the student may not have fully understood the meaning and value of DL in his study programme, especially if she/he plans to go further in Higher Education after the end of the current programme. When similar situations exist, time and effort must be spent to reach

a sufficient level of awareness and interest among the parties; if one of the parties –notably the company- cannot be motivated to engage in DL seriously, it is by far preferable not to insist rather than creating the condition for failure.

Defining together all phases of dual learning path The different roles of the VET provider (mostly coordinated through a well identified representative, a tutor or a teacher) and the host employer (who should normally appoint a mentor/trainer as a reference figure) throughout the different phases and main activities of the DL programme are to be envisaged in this step. In principle, one could say that the higher the degree of collaboration, the higher is the possibility to consolidate the partnership and to make it sustainable in the long term, but less integrated models can also work well, provided that clarity is reached on respective roles and expectations.

The role of the student must not be underestimated. He/she will be the person most constantly involved in DL and the main beneficiary, so he/she should be encouraged to provide feedback and suggestions on how the programme and the methods might be improved to match with his/her own competences, existing strengths and weaknesses, effective learning styles.

The figure below represents the main phases of design and implementation of any training experience applied to the possible roles of the three parties involved: the VET provider, the employer and the student. Collaboration is applied to all the phases of development, from joint macro-design of the DL Programme to the joint evaluation of learning outcomes and programme results at a more general level, in view of its future improvement. In particular, when it is necessary who does what in terms of helping students to achieve learning outcomes it would be too simple to imagine that only two solutions are possible: either the VET provider or the company are “the best place” to develop a given learning outcome. In fact many learning outcomes in VET are best developed through an integrated approach in which VET provider and company have complementary roles and share (rather than divide) the work to be done. This collaborative approach may, among other benefits, allow to identify learning outcomes, achievable through WBL, that were not originally foreseen but might represent important value for the student.



Implementing

The dual learning experience needs **to be monitored** and evaluated to ensure that it is working as planned and to identify areas for improvement. Evaluation involves ongoing formal feedback activities aimed at gathering timely information about the quality of a programme. It is important to build in evaluation activities to identify successes and failures of the dual learning programme with a view to correcting deficiencies, to measure if stated learning outcomes have been achieved, to assess if the dual learning path is meeting the needs of learners and the companies and to measure the cost effectiveness of the experience. Monitoring and evaluation methods include observation, feedback questionnaires, focus groups, interviews, student assessment results and reports which the institution has to provide for internal use) and feed back to companies.

Assessment of learning Outcomes In the designing the assessment methods that measure students' performances', the starting point should be the stated learning outcomes. Assessment must check that students have achieved the learning outcomes

Overall assessment

As with any process, at the end of the dual learning experience, it must be evaluated, identifying strengths and weaknesses and proposing improvements for future training stays.

Once a work based learning program has been delivered, we must reflect on the entire process, confirming any need for change or improvement. For example, it is important to consider whether the agreed learning outcomes were adequate or if the assessment documentation was sufficient to allow recognition to the institution and the country of origin. Evaluation can also be useful to reflect on cases in which recognition can not be achieved as planned. To ensure that the entire process is continuously improved, from preparation and implementation to validation and recognition, the evaluation should involve all partners, and the comments of the students are also an integral part of the process. Comments can be collected in written form (for example, by completing a questionnaire), or by interviews (for example, through meetings, focus groups or telephone contact).

In the annex section, a proposal for the evaluation of the stay is attached.

Based on the actions and evaluation results, the suggested changes and improvements should be considered actively and incorporated as part of the preparation of new projects or work based learning programs in the future.

TRANSNATIONAL DIMENSION OF REFRAME APPROACH

The REFRAME Project considers transnational Dual Learning as an interesting area to explore and suggests that Dual Learning programmes should include, as far as possible, a transnational dimension. This is not only important because the labour markets of different European countries offer different employment possibilities, but also because adding an international work experience to a VET study programme entails additional benefits for the students. Dual Learning across borders offers them the possibility to combine work and study in another country. This way, students are exposed to a different market (abroad), which may offer new career possibilities and, as such, is a way to become more employable. They develop a professional identity with international exposure, which offers them new career possibilities. Students learn about the reality and complexity of a foreign workplace, such as differences in interest at play, learning how to cope with team pressure and different work procedures. By working in another country, they learn to work and cooperate with professionals from different cultures. Furthermore, on the one hand, as an employee with special skills, Dual Learning students can be employed abroad to support a sector in which there may be a shortage of certain skills and offer their home-taught skills to a company/organization abroad.

On the other hand, through **Dual Learning**, students are also offered the opportunity to work in another country where they can learn new professional skills and languages. The need to reach the definition of a set of European" competences shared between the project partners, transferable in other country contexts, as well as the impossibility of identifying a common qualification profile within the countries participating in the project, partners have studied the different curriculum related to the Mechatronic technician EQF 4 and they come up with the definition of learning units and related learning Outcomes, as a field of comparison between the partners. To lay the groundwork on possible mobility opportunities for young people.

The methodology adopted was based on agreeing equivalence between UNITS existing in partners' contexts qualifications rather than working on designing common units. For the purpose of the methodology, the following definitions were adopted:

- a) Modules are components of education and training programs;
- (b) Units are sets of learning outcomes (knowledge, skills and/or competences) that constitute a coherent part of a qualification (Cedefop, 2008b).

A unit can be the smallest part of a qualification that can be assessed, transferred, validated and, possibly, certified (e.g. in relation to ECVET). It can be specific to a single qualification or common to several qualifications.

After identifying qualifications EQF4 within partner counties, curricula were "Translated" in Units of learning outcomes in order to better compare the qualifications. The content of the Unit that will be achieved during the work based learnings should be equivalent to parts of the qualification standard in partners' home system.

To use ECVET for Mobility, it is not necessary to ex ante structure the whole qualification in terms of Units. Similarly, it is not necessary that the partnership agree on comparability or equivalence of all units. In the context of Reframe partners reach an agreement on few units, those that will be achieved

abroad during the mobility. Partners agreed that the size of the unit (number of learning outcomes) have to fit the duration of the mobility period, this means that they will adapt the size of the unit to the duration of the mobility.

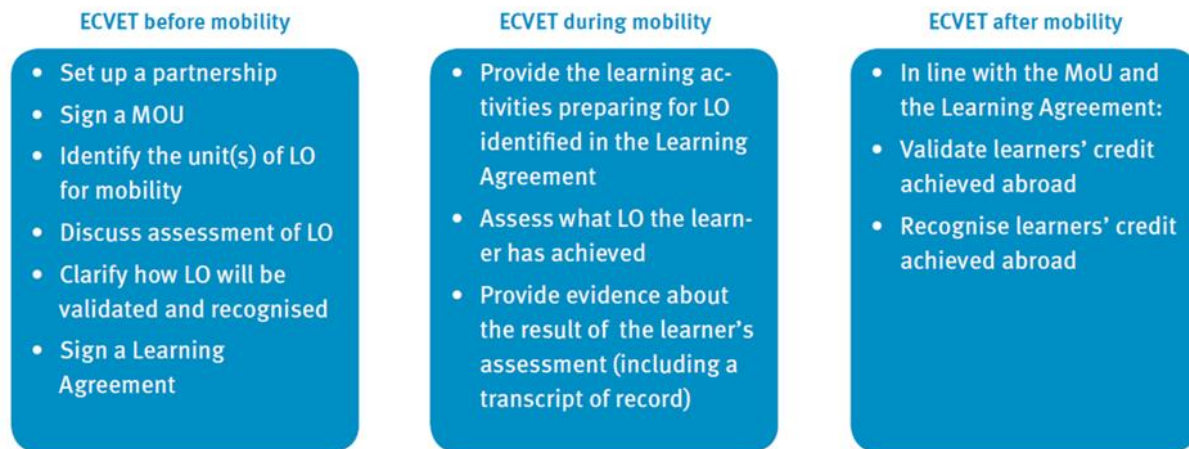
	CATALUNIA	ITALY	THE NETHERLAND	FRANCE
TITLE OF QUALIFICATION	Electromechanical Maintenance	Mechanics, Mechatronics and Energy	Technician Mechatronic system Supervisor automation electronics	Maintenance of industrial devices
EQF LEVEL	4	4	4	4
DURATION	2000 hours			
UNITS 1	Graphical Representation of Mechatronic System	Graphical Representation of Mechatronic System	Produce electro – technical and mechatronic products	Realise corrective and preventive maintenance
UNITS 2	Mechanical Technology and Process	Mechanical Technology and Process	Controls and direct the work process	Set up modifications and enhancements
UNITS 3	Machine Elements	Machine Elements	Checks and test electro-technical and mechatronics products	integrate new devices
UNITS 4	System and automation	System and automation	Installs and modifies mechatronics products	communicate with users, clients and within a team

MAIN STEPS OF USING REFRAME APPROACH TO ORGANISE WORK BASED LEARNING

The application of Reframe approach to the mobility is characterized by the three steps

- **Before the mobility:** The VET-provider or school and the company set up the contents that the students will learn at the workplace within a Memorandum of Understanding (MoU) that is adapted to the needs and profile of the post to be occupied. The signing of a collaboration agreement, between the school and the company guarantees the fulfilling of all the smaller pacts and agreements. Project development of the learning outcomes based, work based learning plans in order to reduce the risks of a mismatch between an overestimated request of the learner (expectations of the learners, of the sending institutions, of the promoters of the work based learning initiatives) and the learning real offer of activities to be realized within the host context.
- **During the mobility:** realization of the work based learning activities in correspondence with the agreed learning outcomes, assessment of the acquired learning outcomes and valorisation them through the collection of “learning proofs”, for an awareness building.
- **After the mobility:** validation of the acquired learning outcomes and certification of the WBL/mobility experience, in order not to lose the precious amount of learning outcomes and promote, therefore, recognition procedures in the sending context through the acquisition of credits points, recognition of the mobility programme plan (time hours of the work placement, time hours of the training at school, etc...) within the formal learning pathway attended in the mother country.

Figure 2 | Key issues to be taken into account before, during and after mobility when using ECVET



Legend: LO: Learning Outcomes; MoU: Memorandum of Understanding

According to this structure, the main steps and phases that must be carried out for planning transnational mobility

	Steps	Phases	Description	Documents
BEFORE MOBILITY	STEP 1: Planning. Formalising a partnership for Mobility	P 1	Set up a partnership. Identifying suitable partners and exchanging information with the support of Reframe platform	Memorandum of Understanding (MoU).
		P 2	Preparation of documentation. Mapping the roles and responsibilities of each actor.	
		P3	Preparation of the mobility period. Programming, organizing and coordinating the training process Planning and organising the stay	Information for the organisation and Implementation of the traineeship.
	STEP 2: Co-design Defining the conditions each individual learner.	P 1	Study of the curriculum and learning programme attraverso le unità di competenza già individuate nell'ambito di	Learning Agreement (LA) in the framework of a MoU.

			Reframe	
		P 2	Identification of the Learning outcomes suitable to be acquired at the company.	
		P 3	Co-design with the company and the students Clarify how LO will be validated and recognised	
DURING MOBILITY	STEP 3: Monitoring. Acquisition and assessment of knowledge, skills and competence during the traineeship	P 1	Company hosting/school protocol. Learning at the receiving institution	Assessment sheet Learners' Personal Transcript Learning outcomes assessments.
		P 2	Monitoring of learning outcomes.	
		P 3	Evaluation of learning outcomes	
AFTER MOBILITY	STEP 4: Evaluation and Improving Conclusion of the process	P1	Validation learning outcomes.	Certificates, workplace certificate.
		P2	Recognition of learning outcomes.	

	Follow-up	p3	Process evaluation.	Evaluation sheets and action plan for implementing changes.
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According this structure, the main characteristics in every step are:

STEP 1: Planning

We could start planning a student stay in many ways, that's why. We have at least three actors in this process: the student, the company and training centre.

A good framework to begin is that every training centre involved in this project must seek available companies in his area, that is set up some partnerships.

The way to set up a new company is signing up a Memorandum of Understanding (MOU): a document explaining the relationship rules between companies, training centres and administration.

Step 2: CO-DESIGN

Once, we have a new partnership it is time to analyse the activities in order to link with the Learning Outcomes that the students will be able to practise at each one.

It must be identified the different Learning Outcomes (LO's) that can be validated and recognised depending on the studies curricula.

When the previous requirements are achieved. We are ready to sign up a Learning Agreement between the three parts: student, company and training centre, where it is explained all agreement conditions, mainly the period and the timetable of the relationship student vs company.

STEP 3: Monitoring

Training centre provides to students and factories a transcript of record. This document includes the learning activities preparing for LO that student will achieve in the company where he will practise.

The LO shown at transcript of the record will be as a result of an agreement between the company and training centre.

Regularly, every involved actors at company will assess about LO.

STEP 4: Evaluation

At the end of student's stay and, once the two assessments have finished, one by the student and the other one by the company, in line with the MoU and the Learning Agreement ,It is time to validate and recognise the credit achieved abroad by the student.

EXAMPLE

The WBL of a Catalan student who an internship in the metal industry sector (Mechatronics) in Italy.

Description	Example
BEFORE WBL/MOBILITY	
Set up a partnership. Identifying suitable partners and exchanging information. Preparation of documentation. Mapping the roles and responsibilities of each actor Preparation of the traineeship period / school period. Programming, organizing and coordinating the	A Catalan school, a vocational school, wants to send a VET student to a company to do internship. In the framework of a project with one partner in Italy a vocational school, developed the Internship Module in the metal/electric/mechatronic industry for the qualification mechatronic technician. For the Italian consortium, a tight partnership between the dual partners, on the one hand, the host organization (VET) and on the other hand, the company– was elementary. Both VET schools had several years of experience in student exchange – even before entering the ECVET topic. To process the Internship module both schools cooperated with a local company – for internal training.

<p>training process</p> <p>Planning and organising the stay</p>	
<p>.</p>	
<p>Study of the curriculum</p> <p>Identification of the Learning outcomes suitable to be acquired at the company.</p>	<p>Nuria will go on one transnational mobility period, lasting 350 hours, about seven weeks.</p> <p>In Italy she will achieve learning outcomes in hydraulics, in machining, PLC programming and elaborate technical documentation. All are topics within the national curricula for mechatronics Spain. All units are assessed through a final assessment (Activities dossier).</p> <p>The process of identification of learning outcomes started with a comparison of national curricula. The VET schools had preliminary knowledge about special competences in teaching in diverse technical fields. In addition, the level of expected learning outcomes had to be decided and ensured.</p> <p>Developing the common units of learning outcomes involves several layers of discussion. From a rough idea concerning a first draft, to an elaborated description of all LO.</p> <p>All the documents (description of LO, timetable for the module) are discussed and validated by the participating partners, mainly the sending and hosting schools and companies. The matching tasks for assessment and the criteria need to be developed in parallel.</p> <p>Through this experience Nuria will achieve some very specific knowledge and skills in mechatronics. These are explicitly specified in the qualification she is preparing for at home. She will also develop more general competences in the area of personal and social competences as well as language skills. The whole module is processed in the English language. If Nuria is positively assessed, she will achieve the Internship module.</p> <p>This will be recorded in the Europass certificate and documented by special certificates. The recognition she receives concerning the curricula of company based learning, is that she does not need to repeat these units in company based training.</p> <p>Nuria and the two VET schools (and in Italy the company) sign a MoU which specifies among other things, the</p>

<p>Co-design (REFRAME platform) Clarify how LO will be validated and recognised</p> <p>Sign a MoU</p>	<p>requirements for assessment, validation and recognition of learning outcomes achieved abroad. The VET schools ensure the quality.</p>
<p>DURING WBL/MOBILITY</p>	
<p>Company hosting/school protocol.</p> <p>Learning at the receiving institution</p> <p>Monitoring of learning outcomes.</p>	<p>As foreseen, Nuria takes part in the training by preparing for the three units; one unit is prepared at home, hosting the foreign students in her VET school and two units are prepared abroad, where she is a guest in the partner institutions. She takes part in company based learning arrangements. It is a good idea to plan cultural activities, in this case, She could follow a cultural programme in the foreign country, participates in sports activities and visits historic places or cultural events. In the youth hostel she arranges with the other foreign students their daily catering and organises evening free time.</p> <p>Nuria is aware of the learning outcomes she is expected to achieve and, if needed, she can request that the teachers let her work and learn further in a specific area that she needs to develop.</p> <p>As foreseen, at the end of the mobility period the VET teacher from the hosting school, the company trainer (if available) and Nuria carry out the assessment about what she has learned. This has three parts: a small paper and pencil test in the school, a skills demonstration / programming task in the company and a technical discussion at the</p>

	<p>end. There is the possibility of participating as a guest observer for a person from the sending institution if interested. The VET teacher of the hosting VET school (and the company trainer) confirms the assessment result. Nuria receives the certificate and optionally, the Europass mobility.</p>
<p>AFTER WBL/MOBILITY</p>	
<p>Evaluation of learning outcomes Provide evidence about the assessment</p> <p>Validate learner's credit</p> <p>Validation learning outcomes. Recognition of learning outcomes.</p> <p>Process evaluation and review</p>	<p>Nuria's skills demonstration (the programme file), her paper and pencil test, the assessment of the VET teacher (and if appropriate the assessment of the company trainer) are recorded and attached to the Learning Agreement which Nuria brings with her to her home institutions.</p> <p>When Nuria returns to her home institutions (VET school), her teacher look at the assessment documents and the certificate and confirm that she has indeed achieved the learning outcomes needed in Internship module which she participated abroad.</p> <p>The Internship module are recorded in Nuria's transcript of record, together with the grade that she has obtained (if appropriate). (Due to the fact that Italy does not have an elaborated credit system, she cannot be awarded credit points.)</p> <p>After all three units have been carried out in the partner countries, the whole partnership is evaluated. All mobile learners, their teachers and the trainers in the companies are asked for their feedback (questionnaire). The aim of this evaluation process is to identify potential areas for improvement and to recommend necessary changes for the future success of this partnership.</p>

GUIDELINES FOR TEACHERS AND TRAINERS FOR HIGH QUALITY WORK BASED LEARNING

This section provides an overview of the main concepts involved in dual learning and enables teachers and trainers to incorporate educational theory into every day practice.

Teachers are responsible for school-based education and training and work based learning, and in some countries, they are also responsible for the link with the TRAINING companies. There is the need to keep existing teachers' pedagogical and subject –specific competences up- to-date to support training provision. One of the aim of Reframe is to support the CPD (Continuous Professional Development) of teachers including student –centred and individualised learning , curricula design and learning – outcome based approach, skills needs analysis.

Conceptual Framework, some definitions

Defining learning outcomes there is no single way of defining and writing learning outcomes; the approach has to reflect the particular purpose and context in question. As documented by Cedefop (2016) the following purposes are common across Europe.

While qualifications frameworks provide a general reference for comparing qualifications and distinguishing levels, learning-outcomes based qualifications standards, curricula and assessment specifications have to be defined and written in a way that 'speaks to' learners and teachers and adds value to the learning process.

Qualifications frameworks Qualifications frameworks at sectoral, national (NQF) or international (EQF) level play an increasingly important role at international, national and sector level. Learning-outcomes-based frameworks seek to increase transparency and allow for comparison of qualifications across institutional and national borders. The learning outcomes descriptors of qualifications frameworks are normally designed using a horizontal axis identifying learning domains (such as knowledge, skills and competence) and a vertical dimension indicating how the complexity of learning increases from level to another.

Qualification profiles and/or standards Qualification (2) standards (3) define the expected outcomes of the learning process, leading to the award of a full or partial qualification. In vocational education and training, profiles or standards normally answer questions such as 'what does the student need to learn to be effective in employment' and 'what does the learner need to learn to become an active citizen, supporting basic human and democratic values?' A qualification standard is not exclusively about promoting skills relevant to the labour market, but must address a broader set of competences relevant to life and society in general. It must also consider the changing nature of the labour market and society and clarify the role of transversal skills and competences, for example related to communication, social skill and problem solving. Many qualification standards or profiles are articulated at national level, reflecting input from various stakeholders

In some countries, these qualification profiles and standards will be divided into modules or units with separate and specific learning outcomes statements. **The European credit system for VET (ECVET)** has paid particular attention to the identification of units of learning outcomes; it sees these as critical for promoting transfer and accumulation of vocational skills and competences across Europe.

Occupational standards Occupational profiles or standards are normally set outside the education and training system, by labour market stakeholders, but can have significant impact on the way learning outcomes statements are defined and written. Occupational profiles or standards specify 'the main jobs that people do', describing the professional tasks and activities as well as the competences typical of an occupation. Occupational standards signal what students must be able to do in employment and can ideally serve as a link between education and training and the needs of the labour market.

Curricula Curricula set the framework for planning learning experiences. Depending on the country, the type of education and training, and the institution, learning outcomes statements form an important part of curricula. They guide teachers in the teaching process, for example supporting the choice of methods, and they inform learners about what they are expected to know/do and understand after a given learning activity. Learning outcomes in curricula can differ in detail; sometimes defining outcomes of an entire programme, sometimes focusing on specific outcomes of a module

(2) The recommendation on the establishment of the EQF for lifelong learning defines qualification as 'formal outcomes of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to a given standard' (European Parliament and Council of EU, 2008, p. 4).

(3) The term qualification standard is not used in all countries, the function described here can, however, be recognised in most countries. The term qualification standard, as used here, can refer to either stand-alone documents (as in the UK and Ireland) or to programme documents at national or institutional level indicating the overarching ambitions for a qualification (e.g. a national Fagplan in the Norwegian vocational education and training system).

Assessment specification and/or standards Assessment specifications identify the methods and the criteria underpinning assessments. These criteria, using learning outcomes statements, are often formulated as threshold levels, which have to be met by the candidate. Assessment standards and the criteria they use are more detailed than qualifications standards and curricula in the sense that they have to describe the requirements precisely to the learner. These requirements normally support summative assessments at the end of the learning process, but can also orient formative assessments taking place throughout the learning process (*The goal of summative assessment is to evaluate student learning at the end of an instructional unit by comparing it against some standard or benchmark. This contrasts formative assessment where the purpose is to monitor student learning to provide feedback that can be used by instructors to improve their teaching and by students to improve their learning. Formative assessment helps students identify their strengths and weaknesses and helps teachers and trainers support student progress*)

Learning outcomes are perceived as adding value for several purposes. However, they are not to be taken for granted: any benefits eventually depend on the way learning outcomes are understood, defined, written and applied. Different uses will emphasise different benefits: (a) **for the learner:** learning outcomes statements clarify what a learner is expected to know and be able to do and understand having completed a learning sequence, a module, a programme or a qualification. They support initial choice of education, training and/or learning paths; they help to orient the learning process itself; and they clarify what to expect during assessment. For learning outcomes statements to make any difference to learners, they must be visible not only in (written) qualification standards and programme descriptions. Their visibility in practice, throughout the teaching and learning process as well in assessment arrangements, is of critical importance and decides whether they add value to the individual learner; (b) **for the teacher/instructor:** the learning outcomes approach helps to orient teaching, to select methods and to support the learning process. Learning outcomes, through their focus on levels of, and requirements to, learning are crucial for promoting a more systematic reflection on assessment criteria and methods and how these interact with and support the learning process; (c) **for the assessor:** the learning outcomes approach supports assessment by clarifying the criteria for success/failure and performance. While most frequently linked to summative assessments, learning outcomes can help with formative assessment throughout the learning process; (d) **for the education and training institution:** learning outcomes provide an important instrument for planning, and for internal and external dialogue. The perspective helps to determine the purpose and orientation of a course, a programme or qualification and to clarify how it relates to and/or overlaps with other courses/programmes and qualifications. Learning outcomes can provide an important reference point for quality assurance; the relationship between intended and actual learning outcomes (as identified through assessments) provides important input to the continuous review and development which is expected from education and training institutions. The learning culture in institutions can change with a learner-focused approach; (e) **for society and labour market:** learning outcomes provide a common language allowing different stakeholders in education and training, as well as the labour market and society at large, to clarify skills needs and to respond to these in a relevant way. If used systematically, this allows for systematic review of the quality and relevance of education and training, focusing on the relationship between intended and actually achieved learning outcomes.

Definition of EQF descriptors

The EQF descriptors were changed in 2016 in order to facilitate their understanding. With the former “KSC” descriptors (Knowledge, Skills, Competences), the meaning of “competences” caused difficulties to many users and was interpreted in different ways.

To ease the understanding and the use, the descriptors were changed into “KS” (Knowledge, Skills) and Autonomy/ Responsibility.

The classification of these three descriptors for EQF level 4 is the following:

- **Knowledge:** Factual and theoretical knowledge in broad contexts within a field of work or study
- **Skills:** A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study.
- **Autonomy/ Responsibility:** Exercise self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change; supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities.

ECVET, EUROPEAN CREDIT SYSTEM FOR VOCATIONAL EDUCATION AND TRAINING

The European Credit System for Vocational Education and Training, often referred to as ECVET, is a technical framework for the transfer, recognition and (where appropriate) accumulation of individuals' learning outcomes with a view to achieving a qualification. Guided by a European-level **recommendation**, ECVET relies on the description of qualifications in units of learning outcomes, on transfer, recognition and accumulation processes and on a series of complementary documents such as a Memorandum of Understanding and Learning Agreement.

ECVET is intended to facilitate the recognition of learning outcomes in accordance with national legislation, in the framework of mobility, for achieving a qualification.

ECVET aims to support the mobility of European citizens, facilitating lifelong learning - achieved in formal, non-formal and informal settings - and providing greater transparency in relation to individual learning experiences, making it more attractive to move between different countries and different learning environments.

At a systems level, ECVET aims towards greater compatibility between the different vocational education and training (VET) systems in place across Europe, and their qualifications.

From a geographical mobility perspective, ECVET aims at facilitating the validation, recognition and accumulation of knowledge and skills acquired during a stay in another country, with a view to ensuring that such achievements can contribute to the achievement of vocational qualifications.

ECVET relies on a series of common goals, principles and technical components that centre on the recognition of learning outcomes and achievements for European citizens undertaking vocational education and training, irrespective of the learning context, location or delivery method.

ECVET works hand in hand with the European Qualifications Framework (EQF) to provide greater transparency in European qualifications, promoting the mobility of workers and learners, and facilitating lifelong learning.

ECVET brings together a wide range of actors, at local, national and European levels, with a view to encouraging its wider implementation and use, particularly in learning mobility.

What are the general objectives of ECVET?

Transnational mobility

Lifelong learning

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How does ECVET contribute to mobility &LLL

Transparency of qualifications

Accumulation process

Transfer process

ECVET technical components

Units of learning outcomes

ECVET points

Transcript of record

Assessment of LO

Validation of LO

Recognition

Memorandum of understanding (partnership)

Learning agreements

Learners' transcripts of record

Process of identification of units of learning outcome

One of the key steps that can be more complicated is the identification of the Learning Output Units (LO).

In this section, guidelines are given to identify the learning outcomes that may be included in the educational stay.

METHODOLOGY

1. Learning Outcomes (LO) = Must be very understandable. Using action verbs as they express competencies and the skills or abilities of the place of work can be taken as a basis, so that it is very clear what they must know when finishing the training.

You can adapt the LO of your own curriculum so that it is easier to agree with other countries, for example by using only the sentence of the LO without specifying both the context of the learning process.

The following table gives some examples of English verbs to define learning outcomes:

Create	design, formulate, build, invent, create, compose, generate, derive, modify, develop
Evaluate	choose, support, relate, determine, defend, judge, grade, compare, contrast, argue, justify, support, convince, select, evaluate.
Analyze	classify, break down, categorize, analyze, diagram, illustrate, criticize, simplify, associate.
Apply	calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, perform, present.
Understand	describe, explain, paraphrase, restate, give original examples of, summarize, contrast, interpret, discuss.
Know	define, name, match, quote, recall, identify, label, recognize.

2. Responsibility and autonomy = related to the level of the European Framework, can be in general or differentiate by each unit, they are directly related to the key competences.

3. Assessment criteria = Those skills among those described will be taken as a reference for evaluation. The student must be able to demonstrate their ability to develop the skills described and their degree of domination determines the note
4. A template is proposed (for the common unit of learning outcomes).

(example) Unit 1: Graphical Representation of Mechatronic Systems (ITALY)

LEARNING OUTCOMES	SKILLS	COMPETENCES	KNOWLEDGE
<p>U1LO1 Recognizes Unified standards of mechanical technical design and a their application in mechanical designs.</p>	<p>U1LO1S1 Design with appropriate tools a mechanical piece according to industrial design standards</p> <p>U1LO1S2 Knowing how to dimension a technical drawing</p> <p>U1LO1S3 Graphic representation of details derived from the overall drawings</p>	<p><i>Deduct the shape of mechanical organs from the design</i></p> <p><i>Being able to read and interpret a technical design</i></p>	<p>U1K1 <i>Criteria of Graphic representation</i></p> <p>1.1 <i>Dimensions and dimensioning standards</i></p> <p>1.2 <i>Study of details in sections and of procedure to obtain a section</i></p> <p>1.3 <i>Drawing an assembly</i></p>
<p>U1LO2 Interpreting and decoding dimensional and geometric</p>	<p>U1LO2S1 Identify how to apply dimensional and shape tolerances to mechanical parts</p> <p>U1LO2S2 Drawing mechanisms and threaded</p>	<p><i>Interpreting and decoding dimensional and geometric tolerances</i></p> <p><i>Apply threaded connections</i></p>	<p>U1K2 <i>Tolerances</i></p> <p>1.1 <i>Dimensional tolerances</i></p> <p>1.2 <i>Geometric tolerances</i></p>

tolerances. Identify fixed or mobile connection organs	piece		1.3 <i>Threads</i>
U1LO3 Use of software CAD in technical drawing (AutoCAD ,Solid Works)	U1LO3S1 Design with appropriate tools CAD apply to industrial design U1LO3S2 Size a drive shaft	<i>Be able to project and draw a transmission shaft or simple mechanical parts. Development of machining cycles of a mechanical part.</i>	U1K3 <i>Using main CAD commands</i> U1K4 <i>Design of a shaft or transmission system (gears, belt Drive)</i>
U1LO4 Know the elements of the business organization and analyse the production phases of a mechanical product	U1LO3S1 Critical analysis of machining cycles and/or assembly U1LO4S2 Know how to classify production systems	<i>Determines industrial project using techniques of project management as GANTT chart, Pert</i>	U1K05 <i>Business organization and Layout of industrial plant and</i> U1K06 <i>Operational programming, progress and Control (Gantt, Pert)</i>

Example of planning a unit of LO in Mechatronics EQF4

In general, it is important that there is a balance of sizes between the different units of LOs. Taking into consideration the final objective of the REFRAME project, we should aim to draft units of LOs which are not too broad in order to facilitate the possibilities of mobility.

For example, we could consider these “units of learning outcomes” for each qualification (EQF4):

MECHATRONICS qualification

Unit 1. Graphical Representation of Mechatronic Systems

Unit 2. Mechanical Technology and Processes

Unit 3. Machine Elements

Unit 4. Systems and Automation

AUTOMATION qualification

Unit 1. Industrial automation

Unit 2. Electrical machines

Unit 3. Electrotechnics

Overview of common competence standards to be considered between Catalonia and Italy

Unit 1. Graphical Representation of Mechatronic Systems

Unit 2. Mechanical Technology and Processes

Unit 3. Machine Elements

Unit 4. Systems and Automation

(example) Unit 1: *Graphical Representation of Mechatronic Systems (CATALONIA)*

LEARNING OUTCOMES	SKILLS	COMPETENCES	KNOWLEDGE
<p>U1LO1 <i>Determines the shape and dimensions of the products that are manufactured, interpreting the symbols and associating it with their representation in the manufacturing plans.</i></p>	<p>U1LO1S1 Recognizes the different systems of graphic representation.</p> <p>U1LO1S2 Identifies the different formats of planes used in mechanical manufacturing.</p> <p>U1LO1S3 Understand the meaning of the lines represented in the plane (edges, axes, auxiliaries, among others).</p> <p>U1LO1S4 Deduct the shape of the object represented in the views or systems of graphic representation.</p> <p>U1LO1S5 Identify the sections and sections represented in the plans.</p> <p>U1LO1S6 Recognize the different views, sections and details of the plans, determining the information</p>	<p>Identify the relevant information, interpreting plans, schemes and technical data sheets to obtain the necessary data.</p>	<p>U1K1. Determination of forms and dimensions represented in manufacturing plans:</p> <p>1.1 Interpretation of manufacturing plans.</p> <p>1.2 Industrial drawing standards.</p> <p>1.3 Joint planes and cutting.</p> <p>1.4 Systems of graphical representation.</p> <p>1.5 Procedure to obtain views.</p> <p>1.6 Procedure for obtaining cuts and sections.</p>

	<p>they contain.</p> <p>U1LO1S7 Characterizes the normalized forms of the represented object (threads, welding, entalladuras and others). ...</p>		
<p>U1LO2 <i>Identifies tolerances of shapes and dimensions and other characteristics of the products that are intended to be manufactured, analyzed and interpreted the technical information contained in the manufacturing plans.</i></p>	<p>U1LO2S1 Recognize the standard elements that will form part of the set.</p> <p>U1LO2S2 Determines the dimensions and tolerances (geometric, dimensional and surface) of the fabrication of a represented objects.</p> <p>U1LO2S3 Identify the materials of the represented object.</p> <p>U1LO2S4 Identifies the thermal and surface treatments of the represented object.</p> <p>U1LO2S5 Determine the joining elements.</p> <p>U1LO2S6 Values the influence of the data determined in the quality of the</p>	<p>Identify the relevant information, interpreting plans, schemes and technical data sheets to obtain the necessary data.</p>	

	finished product.		
U1LO3 Sketches of tooling and tools to execute the processes, defining the constructive solutions in each case.	<p>U1LO3S1 Select the most appropriate graphical representation system to represent the constructive solution.</p> <p>U1LO3S2 Prepare the instruments of representation and necessary supports.</p> <p>U1LO3S3 Make the sketch of the constructive solution of the tooling or the tool according to the rules of graphic representation.</p> <p>U1LO3S4 Represents in the sketch the shape, the dimensions (dimensions, dimensional, geometric and tolerances)</p> <p>Superficial), the treatments, the standardized elements and the materials.</p> <p>U1LO3S5 Make a complete sketch in a way that allows the development and construction of the tooling.</p>	<p>Identify the relevant information, interpreting plans, schemes and technical data sheets to obtain the necessary data.</p>	



	U1LO3S6 Propose possible improvements to the tools and tools available.		
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Once the learning outcomes of each region have been identified, and grouped together in a meaningful unit, it is time to make a standard common competence for all territories.

These common learning outcomes are those that will serve as an interchange for the recognition of studies.

Unit 1: Graphical Representation of Mechatronic Systems (COMMON Template)

Qualification standards for EQF level 4 qualifications in mechatronics – WBL

Detailed description of Units of Learning Outcomes

Unit Learning Outcomes 1: Graphical Representation of Mechatronic System.	
Responsibility/Autonomy	
<p>Identify the relevant information, interpreting blueprints, schemes, sketches and technical data sheets to obtain the necessary data.</p> <p>Obtain the necessary resources to execute the assembly or the maintenance of the installations.</p> <p>Propose modifications of the installations according to the technical documentation to guarantee the feasibility of the assembly, solving the problems of his competence and informant of other contingencies</p>	
Skills	Knowledge
<p>U1S1: Determines physically the products that will be manufactured.</p> <p>U1S1.1 Determines the form and dimensions of the products that are manufactured, interpreting the symbolism and associating it with its representation in the manufacturing plans</p> <p>U1S1.2 Identifies tolerances of shapes and dimensions and other characteristics of the products that are to be manufactured, analysed and interpreted the technical information contained in the manufacturing blueprints.</p> <p>U1S1.3 Sketches of tooling and tools to execute the processes, defining the constructive solutions in each case</p>	<p>U1K1 Interpretation of manufacturing blueprints</p> <p>U1K2 Industrial drawing standards</p> <p>U1K3 Joint planes and cutting</p> <p>U1K4 Systems of graphical representation</p> <p>U1K5 Procedure to obtain views</p> <p>U1K6 Procedure for obtaining cuts and sections.</p> <p>U1K6 Tolerance system</p>

<p>U1S2: Selects the processed material, identifying the properties of the materials and relating them to the technical specifications of the pieces to be built.</p>	<p>U1K7 Geometric tolerances of shape and position U1K8 Representation of joint elements U1K9 Obtaining views from models and models.</p>
<p>U1S3: Controls the dimensions, the geometries and the surfaces of the products, comparing the measures with the product specifications</p>	<p>U1K10 Identification of raw materials for machining U1K11 Mechanical properties of materials U1K12 Material profiles. Cataloging and standardization. U1K13 Dimensional verification</p>
<p>Assessment criteria</p>	
<ul style="list-style-type: none"> ▪ Recognizes the different systems of graphic representation ▪ Identifies the different formats of blueprints used in mechanical manufacturing ▪ Recognize the different views, sections and details of the plans, determining the information they contain ▪ Recognize the standard elements that will form part of the set ▪ Characterizes the normalized forms of the represented object (threads, welding, and others) ▪ Determines the dimensions and tolerances (geometric, dimensional and surface) of the fabrication represented objects ▪ Determine the joining elements ▪ Make the sketch of the constructive solution of the tooling or the tool according to the rules of graphic representation with the necessary supports ▪ Represents in the sketch the shape, the dimensions (superficial, dimensional, geometric and tolerances), the treatments, the standardized elements and the materials ▪ Identify the measuring instruments, indicating the magnitude they control, their field of application and accuracy ▪ Applies techniques and procedures for measurement of dimensional, geometric and surface parameters 	



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Unit Learning Outcomes 2: Mechanical Technology and Processes.	
Responsibility/Autonomy	
Repair, maintain and substitute equipment and elements at the installations to assure or reinstate the conditions of operation	
Produce and/or join mechanical components for the maintenance and assembly of the electromechanical installations	
Skills	Knowledge
<p>U2S1: Defines the process to follow during the operations of assembly and bonding.</p> <p>U2S1.1 Identifies the materials used in the processes of assembly and bonding, identifying the influence of their properties</p> <p>U2S1.3 Makes non and welded joints, analysing the features of each joint and applying the adequate techniques to each type of union</p> <p>U2S1.4 Prepares the junction to assemble fixed elements, analysing the type of welding and the procedures established in the processes sheet</p>	<p>U2K1 Measuring and comparing tools</p> <p>U2K2 Operations of outline and conformation</p> <p>U2K3 Execution of non-welded unions</p> <p>U2K4 Election and use of proper tools</p> <p>U2K5 Preparation the junction zone</p> <p>U2K6 Processes and techniques of electric welding, electrode, MIG</p> <p>U2K7 Defects at the processes of welding</p> <p>U2K8 Calculate parameters</p>
<p>U1S2: Applies machining techniques</p> <p>U2S2.1 Applies manual machining techniques, relating the procedures to the product to be obtained.</p> <p>U2S2.2 Works with chip tear shaving machine-tools, relating their functioning to the process conditions and the features of the final product.</p>	<p>U2K9 Manual machining operations</p> <p>U2K10 Calculate parameters</p> <p>U2K11 Use of with chip tear shaving machine-tools</p> <p>U2K12 Correction of the deviations</p>

<p>U2S3: Carries out assembly and dismantling operations of mechanical and electromechanical elements in machines, interpreting the technical documentation provided by the equipment manufacturer.</p> <p>U2S3.1 Determines the functional blocks of machines and equipment, interpreting blueprints of elements and sets of machines and equipment and circuit diagram</p> <p>U2S3.2 Carries out simple repair or modification operations in the functional status of the machine, following the instructions contained in the reference plans</p> <p>U2S3.3 Diagnoses breakdowns or operating defects of the machinery's electromechanical systems, interpreting their symptoms and relating them to the malfunctions</p>	<p>U2K13 Functional analysis of mechanisms</p> <p>U2K14 Techniques for assembling the elements of the transmissions</p> <p>U2K15 Identification of manual tools for mounting and disassembly.</p> <p>U2K16 Assembly of machines and equipment</p> <p>U2K17 Measurement and verification of magnitudes in mechanical systems</p> <p>U2K18 Identify hazards</p> <p>U2K19 Achieve safe working conditions</p>
<p>Assessment criteria</p>	
<ul style="list-style-type: none"> ▪ Make plate cuts ▪ Perform trace and mark operations accurately. ▪ Select the tools according to the material and the process that will be carried out. ▪ Select the welding equipment and the input materials according to the base material of the elements that will be attached. ▪ Define correctly the function of each of the elements reflected in the documentation within the block functionality to which they belong ▪ Run the assembly / disassembly of the item according to the prescribed procedures ▪ Perform the test of operation ▪ Verify the final result of the process in accordance with the technical documentation indicated ▪ Determines the safety and personal protection measures that must be taken in the prevention and execution of the different processes 	



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Unit Learning Outcomes 3: Electric-electronic technology.	
Responsibility/Autonomy	
Assemble electrical and regulation and control systems associated to the electromechanical installations, in conditions of quality and safety	
Skills	Knowledge
<p>U3S1: Identify electric parameters U3S1.1 Measures parameters of electric magnitudes in direct current electric circuits, comparing them to the calculations made. U3S1.2 Measures parameters of electric magnitudes in single-phase, three-phase alternating current, comparing them to the calculations made and describing the differences with the alternating current U3S1.3 Assembles section switchboards and associated electrical systems, interpreting the technical documentation and verifying their functioning</p>	<p>U3K1 Basic measurements in electrical circuits of DC U3K2 Measures of voltage, intensity, resistance and power in CC U3K3 Measures of voltage, intensity and power in single-phase and three-phase AC circuits U3K4 Connection of generators and three-phase receivers U3K5 Behavior of elemental receptors (resistors, pure coil and condenser) in CA U3K6 Recognition of the operation of the electrical machines</p>
<p>U3S2: Assembles and maintains electric rotating machines, assembling their elements, connecting and checking its functioning U3S2.1 Recognizes the functioning of electric machines, identifying their application and determining their features U3S2.2 Identifies the features of the transformers, connecting and checking its functioning through calculations U3S2.3 Diagnoses faults in electric-electronic systems, by using measuring equipment and relating the causes of the faults to the dysfunctions caused.</p>	<p>U3K7 Electric motor. Basic constructive and functional characteristics U3K8 Electric transformer. Basic constructive and functional characteristics U3K9 Assembly and maintenance of rotating electric machines U3K10 Identification of transformer characteristics U3K13 Identify hazards U3K14 Achieve safe working conditions</p>

Assessment criteria

- Identifies the main electrical magnitudes (voltage, intensity and resistance) and have been used correctly
- Develop and interpret electrical circuit diagrams, using standardized symbols
- It performs calculations of improvement of the power factor in electric installations
- Calculate the drivers section of an installation, considering the prescriptions prescribed
- Identify types of electric machines
- Recognizes the mechanical and electrical elements of the machines
- Makes calculations to verify with measurements the correct operation
- Class breakdowns

Unit Learning Outcomes 4: System and automation.	
Responsibility/Autonomy	
<p>Assemble the mechanical, hydraulic, pneumatic, automated system with PLC and other auxiliary systems associated to mechatronics installations.</p> <p>Diagnose the dysfunctions of the equipment and elements of the installation, using the appropriate means and applying established procedures with the required security.</p>	
Skills	Knowledge
<p>U4S1: Assembles pneumatic and hydraulic automatisms</p> <p>U4S1.1 Identifies the elements forming pneumatic and electro-pneumatic circuits, according to their physic and functional features</p> <p>U4S1.2 Identifies the elements forming hydraulic and electro-hydraulic circuits, according to their physic and functional features</p> <p>U4S1.3 Assembles pneumatic/electro-pneumatic and hydraulic/electro-hydraulic automatisms, interpreting the technical documentation, applying connection techniques and carrying out functional tests and adjustments</p> <p>U4S1.4 Assembles and maintains automated systems with programmable controller, interpreting the technical documentation and verifying their functioning.</p>	<p>U4K1 Identification of pneumatic and electro-pneumatic equipment and parts</p> <p>U4K2 Assembly of pneumatic and electro-pneumatic circuits</p> <p>U4K3 Diagnosis of pneumatic elements</p> <p>U4K4 Identification of hydraulic and electro- hydraulic equipment and parts</p> <p>U4K5 Assembly of hydraulic and electro- hydraulic circuits</p> <p>U4K6 Diagnosis of hydraulic elements</p> <p>U4K7 PLC's programming to control pneumatic and hydraulic circuits</p> <p>U4K8 Identification of elements and characteristics in blueprints and schemes</p> <p>U4K9 Physical configuration of simple automation</p> <p>U4K10 Integration of programmable robots</p>

<p>U4S2: Integrates a manipulator and / or a robot in the global assembly of a machine, equipment or production line automated controlled by PLC, installing it, mounting connections and making simple programs for its operation</p> <p>U4S2.1 Identifies the devices and components that configure automated and / or robotised automatic systems</p> <p>U4S2.2 Integrates industrial communications to the global assembly of a machine, equipment or production line automated controlled by PLC, installing and connecting the physical components.</p>	<p>U4K11 Integration of manipulators and robots</p> <p>U4K12 Integration of industrial communications</p> <p>U4K13 Identify hazards</p> <p>U4K14 Achieve safe working conditions</p>
<p>Assessment criteria</p>	
<ul style="list-style-type: none"> ▪ Identifies the differentiating characteristics between pneumatic and electro-pneumatic automatisms. ▪ Recognizes, for the function and typology, the different elements used in the realization of pneumatics and electro-pneumatic automatisms ▪ Recognizes, for the function and typology, the different elements used in the realization of hydraulic and electro-hydraulic automatisms ▪ Performs the physical interconnection of the elements ▪ Make cabling and the connection of the automaton (inputs, outputs and power supply). ▪ Regulates the physical variables that characterize the operation of the automatism ▪ Adjustments and / or modifications for proper functionality of the automatism ▪ Complete simple manipulator and robot control programs. 	

TOOLS

The following points can be used by the teachers and organizers of the stays to self-evaluate their degree of knowledge of each phase and steps of mobility based on ECVET.

It can also be used as the basis for reviewing the actions necessary to ensure the quality of the stay.

Overall Assessments

Evaluation of the project

I. Preparation of the stay

Identify the initial difficulties that arose when preparing the stays and how they were solved (calendar, evaluation methodology, identification of URAs, documentation signing) Have you had difficulty agreeing on the practical and logistical aspects of the project?

How did you ensure that the participants had the appropriate pedagogical and linguistic preparation for the stay?

II. Monitoring the project

Was communication with the guardian of the reception center? If not, indicate the proposed solution.

The difficulties that arose during the project were solved effectively. If not, indicate the proposed solution.

Did the agreements initially agreed? If not, indicate the proposed solution.

III. Results

Have you implemented new teaching-learning methodologies in the course of the project?

Have the objectives of the project been achieved?

- Regarding the number of mobility
- Regarding the use of stays
- Regarding the number and severity of incidents
- Concerning the satisfaction of the participants, students, families and teachers involved

IV. Spreading

How the dissemination of the project has been made. What means and tools have you used?

V. Good practices

Best practices to keep in mind for future mobility.

VI. Continuous improve

Identify the proposals for improvement in the face of future training stays (logistics, accommodation, calendar, evaluation methodologies, follow-up of the stay, preparation of the participants ...)

Check list for teachers

Description	Example
BEFORE MOBILITY	
Set up a partnership. Identifying suitable partners and exchanging information. Preparation of documentation. Mapping the roles and responsibilities of each actor Preparation of the traineeship period / school period. Programming, organizing and coordinating the training process Planning and organising the stay Study of the curriculum Identification of the Learning outcomes suitable to be acquired at the company.	QUESTIONS ABOUT EVERY PART OF THE PROCESS Do the partners know and understand the roles and functions of the competent institutions involved in the partnership? Do the competent institutions involved cover the functions with regard to ECVET (including the validation and recognition of learning outcomes) relevant for the partnership? In other words, are those institutions that need to take part in credit transfer involved? Are the relevant (national, regional, sectoral) rules and regulations met when selecting partners abroad to ensure credit transfer (such rules and regulations could refer to, for example, the required learning sites (e.g. classroom or company), qualification of teachers or trainers, or assessment procedures)? Do the partners in an ECVET partnership understand and agree on their roles and tasks? Do the partners communicate in an open manner? Does each of the partners have clear and explicit objectives for participation in the partnership? Is there a clear agreement among the partner institutions about expected achievements?

<p>Co-design (REFRAME platform) Clarify how LO will be validated and recognised</p>	<p>Are all agreements that are connected with acquiring and assessing knowledge, skills and competence abroad and their transfer to the home institution specified in writing? Are all actors concerned aware of the content of the document and the issues they have agreed upon? Is the information included in the MoU sufficient to outline the general framework of cooperation?</p> <p>Selection of learning outcomes: Has a (have) unit(s) of learning outcomes for mobility been identified? Is it clear how this (these) unit(s) relates to the qualification the learner is preparing for? Has the home institution clearly identified how the learning outcomes can be transferred and recognised? Given learners' prior knowledge, skills and competence, their language skills, the duration of the mobility and the learning opportunities in the host institution, is it feasible:</p> <ul style="list-style-type: none"> • for learners to achieve the defined learning outcomes abroad? • to assess the defined learning outcomes abroad? <p>Description of learning outcomes: Are the learning outcomes descriptions understandable for the main actors involved (learners, teachers/trainers in home and host institutions, any other competent institution that will validate and recognise learning outcomes from abroad)? Is there a clear link between the planned assessment and the defined learning outcomes? Do the planned assessment criteria and methods enable the evaluation of whether the learner has achieved the defined learning outcomes?</p> <p>Do the actors involved (host and home institution and any other competent institution involved) agree on assessment procedures and criteria? Is this agreement related to the questions about who, how, when, etc. and is it described in</p>
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	<p>a transparent way (for example, in the Learning Agreement)?</p> <p>Do the actors involved ensure that the assessment they envisage is feasible and appropriate (for example, taking into account constraints such as time and resources available or the language skills of learners and assessors)?</p> <p>Does the host institution understand well the level of performance expected by the home institution?</p> <p>Are the assessment criteria and indicators clearly related to the agreed learning outcomes and are the assessment procedures clearly related to the assessment criteria and indicators?</p> <p>Are the assessment method(s) and criteria appropriate for the learning outcomes concerned (not too complex and not too simple) and feasible for the mobility period?</p> <p>Is it clear how the results of a learner's assessment will be documented in his or her transcript of records (thus when the learner returns to his or her home institution, is there evidence on the results of assessment to validate and recognise his or her credit)?</p> <p>Is it clear how learners' credit will be validated and recognised?</p> <p>Is it clear who is responsible for the validation and recognition of a learner's credit? Is the mobile learner aware of how this will be done?</p> <p>Are the persons responsible for a learner's pathway and possibly the certification, aware of the practical results of validating the learner's credit (for example, exemption from taking certain courses, exemption from formal or summative assessment, acquisition of extra credits) and of recognising the learner's credit (for example, registering a unit in a learner's transcript of record, issuing a certificate, registering the credit in any other way in the learner's transcript of record)?</p> <p>Are the practical procedures and responsibilities for validation and recognition of a learner's credit documented in partnership agreements (MoU and/ or LA)?</p>
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	<p>Does the Learning Agreement identify the learning outcomes to be achieved, how these will be assessed and how learners' credit will be validated and recognised?</p> <p>Does the host institution agree with preparing the learner for the achievement of these learning outcomes?</p> <p>Is there agreement about how the host institution will document the result of the assessment (assessment grid, written statement – in what language[s])?</p>
<p>DURING WBL/MOBILITY</p>	
<p>Company hosting/school protocol. Learning at the receiving institution</p> <p>Monitoring of learning outcomes.</p>	<p>Are all actors concerned (such as teachers, trainers, the mobile learner) aware of all aspects of the planned learning process abroad that are relevant for their roles (for example, have they received a copy of the Learning Agreement or have they been briefed about their roles in the mobility phase)?</p> <p>Is the host institution acting according to its responsibility for the quality assurance of the learning context (for example, safety regulations are respected, the relevant activities can be carried out during the mobility period, the necessary equipment is available, guidance is provided to the mobile learner, teachers or trainers have the required competences for supporting the learning process of the mobile learner)?</p> <p>Is the host institution acting according to its responsibility for the quality assurance of the learning process as such? In other words: do they help the learner to acquire the learning outcomes defined in the Learning Agreement?</p> <p>Is there a designated person who has the responsibility to oversee the mobility process in the host institution (for example, is a tutor appointed)?</p>

	<p>Does the learner know whom to contact if he or she sees that the Learning Agreement is not being implemented?</p> <p>Are the learning activities the learner takes part in at least those which have been foreseen in the phase before mobility?</p> <p>Are procedures put in place to ensure compliance with the arrangements laid down in the Learning Agreement (for example, does the person in charge in the host institution carry out regular checks that everything is in line with the Learning Agreement)?</p> <p>Are procedures put in place for the handling of problems which might occur during the learning period abroad?</p> <p>Are all actors concerned (such as teachers, trainers, the mobile learner) aware of the assessment criteria to be used to assess the learner?</p> <p>Are the assessment procedures and criteria used in line with what has been agreed on?</p> <p>Is the learner provided with the evidence of his or her assessment which will serve as basis for the validation and recognition of credit?</p> <p>Is the learner's transcript of record issued by the host institution in a timely manner upon completion of the mobility period?</p> <p>Does the learner's transcript of record clearly set out what has been achieved?</p> <p>Is the information presented in an understandable way for the person who is expected to validate learners' credit achieved abroad as well as for other potential target groups (such as employers)?</p> <p>Do the assessed and documented learning outcomes correspond to what has been agreed on in the Learning Agreement and/or the MoU (or go beyond this agreement)?</p>
<p>AFTER WBL/MOBILITY</p>	

<p>Evaluation of learning outcomes</p> <p>Validation learning outcomes.</p> <p>Recognition of learning outcomes.</p> <p>Process evaluation.</p>	<p>Has the learner achieved the expected learning outcomes, based on the evidence of his or her assessment in the host institution?</p> <p>Can his or her credit be validated in line with the LA? If not, why?</p> <p>Has the learner been treated fairly in the validation process (taking into account issues such as circumstances of the assessment, differences in the learning environment between home and host institution or possible language barriers they may have faced in the host institution)?</p> <p>Do the actors involved implement the practical results of validating learners' credit (for example, exemption from taking certain courses, exemption from formal or summative assessment, acquisition of extra credits)?</p> <p>Can his/her credit be recognised in line with the Learning Agreement? If not why?</p> <p>Do the actors involved implement the practical results of recognising learners' credit (for example, registering a unit in a learner's transcript of record, issuing a certificate, registering credit in another way in the learner's transcript of record)?</p> <p>Can the mobile learners progress in their training pathways as planned?</p> <p>In case it was not possible to implement the validation and recognition process as planned in the Learning Agreement, does the home institution:</p> <ul style="list-style-type: none"> • identify the reasons for deviating from the Learning Agreement? • make it clear to the learner why? • identify remedial measures?
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