D2.1 FivE Communication Guideline(s)

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1. The project in a nutshell

Micro-credentials[1] in vocational education and training (VET) are a way to recognize and validate specific skills and knowledge acquired by students in focused training programs. They are designed to provide individuals with relevant training, aligned with industry needs and earned relatively quickly, and at a lower cost, when compared to traditional degree programs.

FivE project (Innovative VET scalable Micro Credential solutions that **Engage, Explore, Explain, Elaborate and Evaluate)** aims to develop, test, and pilot an innovative cross sectorial VET scalable platform offering **Competence Units (CUs),** leading to **Micro-Credentials (MCs).** Therefore, emphasizing a systematic change towards modernizing and digitalizing work-based learning practices, supporting the green transition.

The project will address Welding and Fish Farming industries, as case studies, to develop an innovative **European Forward Looking Approach to Micro-credentials.** Common approaches to developing and using micro-credentials at the EU level can support and enhance national efforts for their quality, transparency, cross-border comparability, recognition, and portability. It can also help to build trust in micro-credentials for the benefit of learners, employers, and education and training institutions.

FivE objectives are the following:

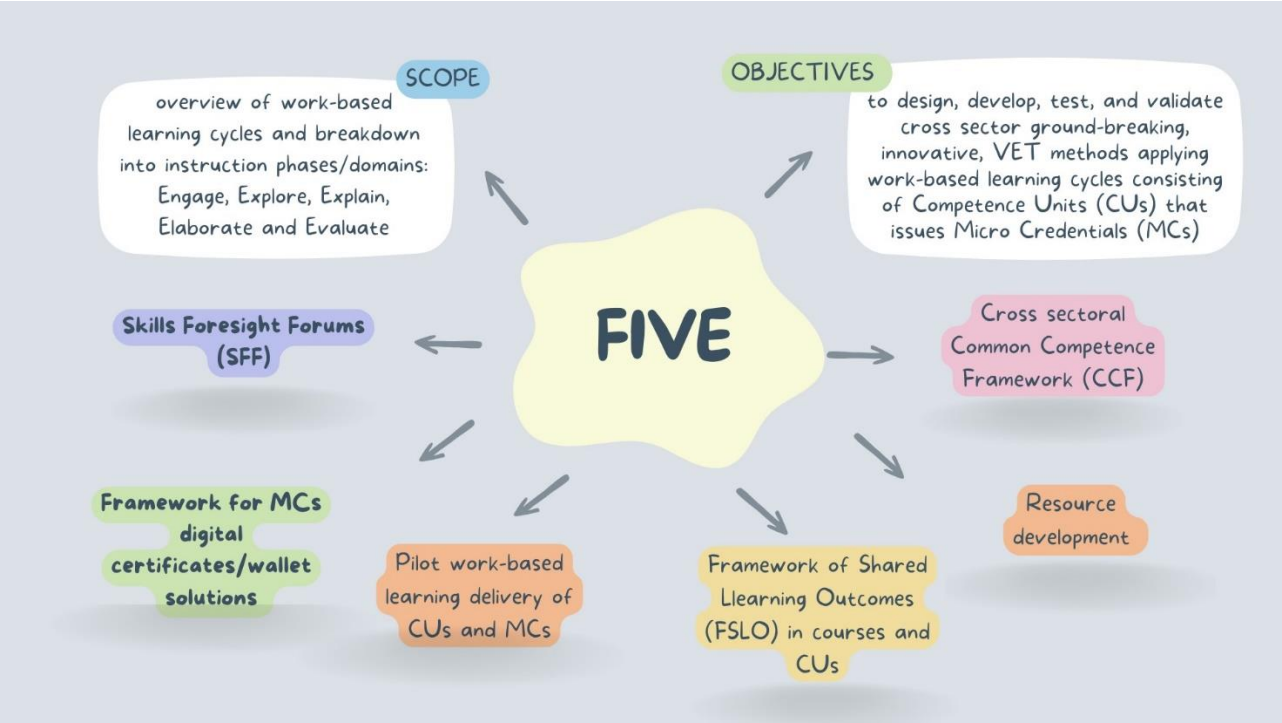
- Establish national “Skills Foresight Forums” (SFF) – that will engage industry and VET providers to give direct input on developing, guiding, and providing the protocol principles to consider when designing, standardizing, and issuing CUs leading to high-quality MCs.
- Develop a “Shared Framework of Learning Outcomes” (SFLOs) underpinned by an industry led Common Competence Framework - that will inform the collaborative development of learning resources, assessment processes and pedagogy.
- Develop “New work-based learning pedagogies, digital learning resources and tools” – that will allow each country to create a ‘blend’ of work-based and alternative methods of VET delivery of CUs and MCs on a pic and mix basis, to suit its own priorities, resources, national VET systems and stage of European Qualification Framework (EQF) development.

Partner organisations in the project represent, both education and industry from four participating countries (Norway, Slovenia, Belgium, and Hungary).

[1] RECOMMENDATION ON AN EUROPEAN APPROACH TO MICRO-CREDENTIALS FOR LIFELONG LEARNING AND EMPLOYABILITY (2022) https://data.consilium.europa.eu/doc/document/ST-9237-2022-INIT/en/pdf

The project is coordinated by Easy Learning Solutions (ELS) (Norway) and counts with the following partners: QMS (Norway), EWF (Belgium), MATRAI and INOX (Hungary), IZV and SDVT (Slovenia), TC (Norway). The project will run for three years, from January 2024 to December 2026.

2. Overview of the project



A CU may lead to a MC. A successful assessment process will help issuing a CU. The key baseline for a FSLO is a fundament containing well defined protocols.

2.1 Scope

The High-FivE pedagogical methodology describes and provides an overview of the theoretical and work-based learning cycles and breaks them down into five work-based instruction phases or domains: **Engage, Explore, Explain, Elaborate and Evaluate.**

These FivE pedagogical model domains: Engage, Explore, Explain, Elaborate and Evaluate, are key elements of a complete cross sectoral model for industry engaged delivery of work-based learning within Vocational Education and Training (VET) programs, to be provided to staff from fin-fish producer organizations and mechanical fabrication industry in Europe. In some lessons, teachers and instructors will naturally apply and switch between several domains in response to industry fabrication companies and their staff's needs, as well as the learning program requirements. In other training activities, they will move through all five domains

2.2 Objective

- To design, develop, test, and validate cross sector ground-breaking, innovative, VET methods applying work-based learning cycles consisting of **Competence Units (CUs**) that issues **Micro Credentials (MCs),** and break them down into five work-based instruction phases or domains: **Engage, Explore, Explain, Elaborate and Evaluate (FivE).**

2.3 Specific objectives

- ✓ Set up, organize, and deliver the Skills Foresight Forums in NO, SL and HU, that brings together stakeholders from different sectors, including government, industry, education, and labour, to anticipate and plan for future skills needs in the workforce.
- ✓ Develop a framework of learning outcomes descriptions for two pilot courses with their CUs, including an assessment module to issue MCs.
- ✓ Develop a portability framework guideline with specification of MCs for emerging digital wallet solutions.
- ✓ Organize and provide cross sectoral pilot training that delivers VET as independent CUs with MCs in 3 countries.

FivE project activities will set the stable foundations and mechanisms for industry involvement, influence, and leadership, to inform 'down-stream' collaborative VET developments.

It will support VET providers and their partners to anticipate production problems and indicate companies' receptiveness to developing solutions, thereby helping the selection and prioritization of local business innovation support activities.

2.4 Activities

- ✓ **Establishing the Skills Foresight Forums (SFF) –** a core membership between industrial companies and VET providers to ensure the linkage between the SFF remit and innovative VET development.
- ✓ **Cross sectoral Common Competence Framework (CCF)** – for husbandry operatives for cold water finfish farming, and for welder specialist levels.
- ✓ **Framework of Shared Learning Outcomes (FSLO) in courses and CUs** – agreed framework/ protocols for describing learning outcomes, with reference to the CCF for husbandry operative and welding Inspectors, and EQF levelled to differentiate VET from higher VET.
- ✓ **Framework for MCs digital certificates/wallet solutions** - a common framework for MC digital certificates so that this can be stored in the upcoming European Digital Wallet.
- ✓ **Resource development** - A set of e-learning quality and technical standards will be established to ensure compatibility with each partners Managed Learning Environment (MLE).

- ✓ **Pilot work-based learning delivery of CUs and MCs** - The revised partnership work-based blended learning delivery system including the resources and pedagogy will be piloted with learners and feedback gathered.

3. FivE Stakeholders

FivE key stakeholders are **learners, industry representatives, and Vocational Education and Training (VET) providers** from Welding and Fish Farming industries, which will benefit, and are central, to the project's aim of creating innovative MCs and work-based learning solutions. These stakeholders will be reached through a 1:1 communication strategy, outlined below, tailored according to each category of stakeholder and continuously refined as the project progresses. Thus, ensuring dedicated and personalized engagement based on emerging results. FivE effective communications, will ensure that the right information reaches the right audience at the right time, maximizing the project impact.

3.1. Key Stakeholders Engagement

3.1.1. Learners

Learners involved in the FivE project, either at Basic and Continuing VET and Higher VET, primarily from the aquaculture and mechanical industry sectors, are critical stakeholders as they will directly experience and test the innovative MCs learning models developed through the project. Their participation in pilot programs will provide valuable feedback on the new work-based learning methods and common framework leading to MCs.

To ensure 1:1 communication with learners, throughout the project, **personalized emails** (e.g., with regular updates), **and dedicated events** (e.g., where learners can share their experiences) will provide individual learners with the guidance they need and access to additional support to help them succeed and feel engaged in the project's outcomes.

3.1.2. Industry Representatives

Industry representatives from finfish production, mechanical industries, and technology supply are highly interested in the development of Micro-Credentials that align with their sectors and workforce needs. These stakeholders, including large companies and Small Medium Enterprises (SMEs), that will play a pivotal role in shaping a Common Competence Framework (CCF) and ensuring that the project's outputs meet the real-world demands of their industries. As they provide feedback on the pilot programs, industry representatives will help fine-tune the MCs, ensuring that they can be integrated into company-specific training programs and improve operational efficiency.

To foster 1:1 communication with industry stakeholders, the project will conduct individual consultations with key industry leaders, ensuring that their specific needs and concerns are addressed. Each company or industry group will receive **personalized briefings** on how to adopt and apply the project's outputs within

their own organizations. As the project progresses and results emerge, dedicated communication with these stakeholders will focus on the relevance of the MCs for improving workforce skills. Industry representatives will be regularly consulted through **direct meetings, participation in workshops, and virtual discussions** within the Skills Foresight Forum (SFF). These efforts will ensure that each industry player can influence and benefit from the project's outcomes on an individual level, while also contributing to the broader goals of cross-sectoral collaboration.

3.1.3. Vocational Education and Training Providers

VET providers are crucial partners in the FivE project, as they will design, implement, and test the innovative MCs and work-based learning pedagogy. These providers, including institutions like IzV, Matrai and TC, are responsible for shaping the educational framework that will directly impact learners and industry. Their expertise in developing new learning resources, competence units (CUs), and assessment methodologies will be vital for ensuring that the project's training models align with industry needs and can be effectively scaled across Europe.

The project will maintain continuous, personalized communication with each VET provider to ensure that their role in the Skills Foresight Forum (SFF) is well-defined and that they are fully integrated into the development process. Direct feedback loops will be established, allowing each VET provider to contribute to the refinement of learning materials and pilot assessments. Regular, tailored updates will be provided through **direct meetings, virtual consultations, and shared project platforms**. As the project evolves, each VET provider will receive individualized support to test and adapt the methods and innovative tools—such as digital certificates and e-learning resources—being developed. This 1:1 communication ensures that VET institutions can not only contribute effectively to the project but also incorporate its outcomes into their own curricula, fostering long-term sustainability and impact.

3.2. Means & Frequency of Communication

Effective communication is a cornerstone of the FivE project, ensuring that all key stakeholders—learners, industry representatives, and VET providers—are actively engaged and informed throughout the project lifecycle. Clear, regular, and tailored communication is essential for aligning stakeholders with the project's goals, maintaining transparency, and ensuring the successful implementation of MCs and work-based learning solutions. The table below details the communication methods and frequency for each category of stakeholder group.

STAKEHOLDER	MEANS OF COMMUNICATION	DESCRIPTION	FREQUENCY
Learners	Specific FivE Events (meetings, courses, conferences)	Disseminations activities in each partner country, namely: • 6 pilot courses	From M18 to M36

STAKEHOLDER	MEANS OF COMMUNICATION	DESCRIPTION	FREQUENCY
	Specific Publications supporting FivE communication	1 Leaflet (EN/HU/SL) – targeted to learners	At least once a year
Industry Representatives	Specific FivE Events (meetings, courses, conferences)	Disseminations activities in each partner country, namely: • 11 Multiplier or SSF events • 4 National Seminars	Throughout the project
	Specific Publications supporting FivE communication	Journal Articles on benefits of work based learning in all fours partner Countries	To be defined
		1 Leaflet (EN/HU/SL) – targeted to companies	At least once a year
VET Providers	Specific FivE Events (meetings, courses, conferences)	Disseminations activities in each partner country, namely: • 11 Multiplier or SFF events • 4 National Seminars	Throughout the project
	Specific Publications supporting FivE communication	Journal Articles on benefits of work-based learning in all fours partner Countries	To be defined
		1 Leaflet (EN/HU/SL) – targeted to VET providers and teachers	At least once a year
All stakeholders	FiVE LinkedIn	A range of hashtags (#) towards the VET and industry sectors will be devised (e.g., #FIVE, #FIVENorway, #FIVEHUNGARY, #FIVESLOVENIA, #FIVEPORTUGAL)	Continuous communication
	FiVE Website		
	Common Publications supporting FivE communication	1 Roll-Up (EN) 1 Poster (EN/HU/SL) 1 Press Release	Project Start & Continuous communication
	Events, Networks and Associations Opportunities **&**	Calendar of EU Conferences Short progress reports Conference Presentations and workshops, including presentations on thematic networks (e.g. EVTA, ADMA, CECIMO, CEEMET) Publications into EU Thematic Portals (e.g., eLearningEuropa.info, the EU Network Portals and more, reaching the lifelong learning community and eLearning news)	Exhibition Calendar throughout the project
	FivE Events (meetings, courses, conferences)	1 European Conference	

Table 1 - Means of communication by stakeholder

As the project progresses, communication strategies will be continuously refined based on emerging results and stakeholder feedback. This dynamic and personalized approach will help drive the successful dissemination and adoption of the project's outcomes, ensuring maximum impact across the VET landscape in Europe.

3.2.1 Social Media

FiVE project recognizes the growing importance of social media as a tool for engaging diverse stakeholders across sectors. Social media platforms offer an effective way to disseminate project results, share updates, and foster meaningful dialogue between partners, industry leaders, and educational institutions. The goal of the project's social media strategy is to leverage digital communication channels to amplify the reach and impact of its innovative MCs and work-based learning solutions.

A key platform for the **project will be LinkedIn,** chosen for its professional environment, which aligns closely with the target groups of the FiVE project. LinkedIn provides an ideal space for aquaculture partners and welding industry stakeholders — those who have a vested interest in the development of their workforces and VET — to engage with the project's content, participate in discussions, and share their experiences and best practices. By focusing on LinkedIn, the project will connect with industry leaders and educational experts to drive forward the development of the aquaculture and welding workforces through innovative VET solutions. Also, regular updates during key project milestones, events, upcoming events (workshops, conferences), or the release of significant outcomes will be posted, ensuring that stakeholders remain engaged, informed, and aligned with the project's progress. This consistent communication will help build momentum, encourage broader participation, and reinforce the project's visibility within the aquaculture and welding sectors.

3.2.2 Events Calendar

To facilitate and guide partners within the range of European EU and National Events, Networks and Associations Opportunities, a preliminary exhibition calendar has been created for 2024, covering a list of potential conference presentations and workshops, where FivE project and its outputs could be promoted during the three year project cycle.

The calendar aims to easily support partners in identifying the events taking place each month, that could potentially be used for networking and for the project promotion and dissemination.

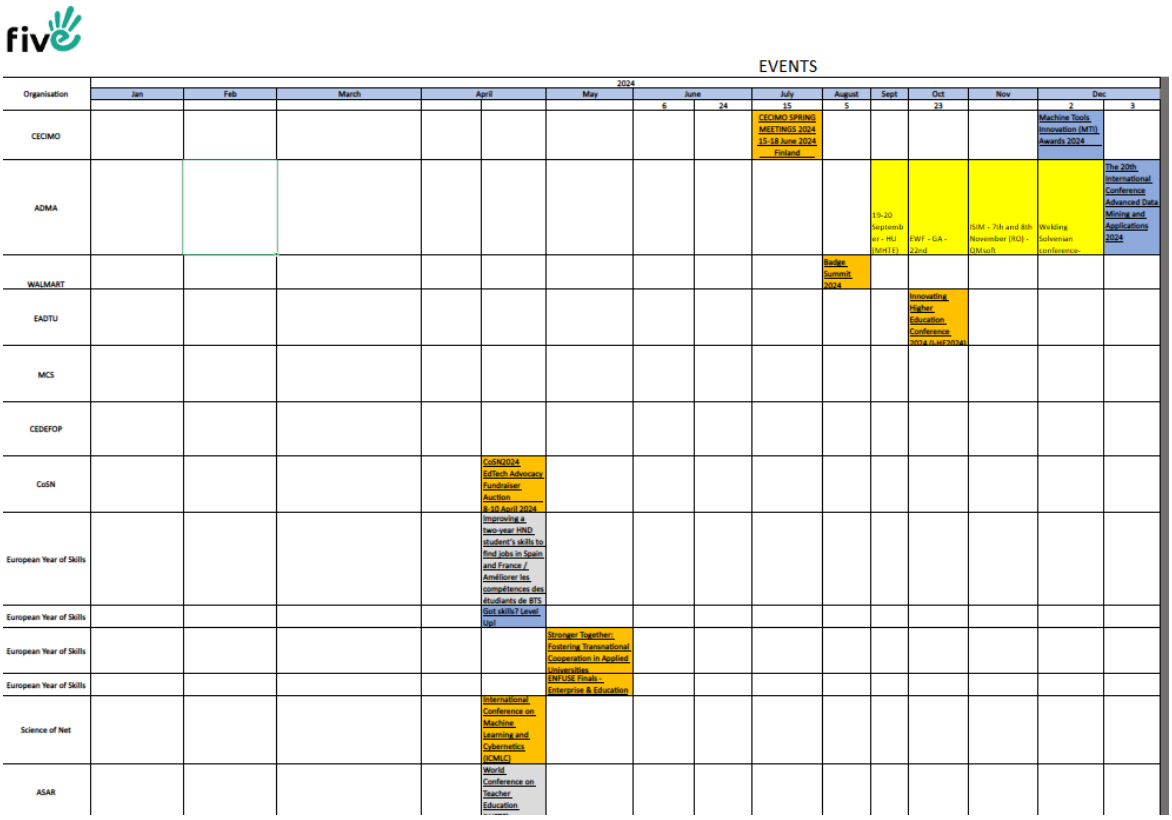


Figure 1 - Events calendar

Short progress reports will be provided by all partners to EWF for promotion to the production representative organizations. A detail overview of the events is provided, identifying the organizers, event name, date, location and further details.

Event Details				
Organization	**Event Name**	**Date**	**Where**	**Website**
CECIMO	CECIMO SPRING MEETINGS 2024	15-18 June 2024	Tampere, Finland	https://www.cecimo.eu/spring-meetings-2024/
Walmart	The Badge Summit 2024	5-7 August 2024	EUA	https://www.thebadgesummit.com/about.html
EADTU	I-HE2024 | Cyprus	23-25 October 2024	Cyprus	https://conference.eadtu.eu/en
MCS	MCS 2025- Micro-Credentials for the future of work	March 2025	Ljubljana, Slovenia	https://summit.microcredentials.eu/
European Year of Skills	Swedish National Skills Competition	23 April 2024, 09:00 - 17:00 (CEST)	Sweden	https://year-of-skills.europa.eu/events-and-activities/swedish-national-skills-competition-2024-04-23_en
European Year of Skills	Got skills? Level Up!	29 April 2024, 09:00 - 17:00 (CEST)	Belgium	https://year-of-skills.europa.eu/events-and-activities/got-skills-level-2024-04-29_en
European Year of Skills	Stronger Together: Fostering Transnational Cooperation in Applied Universities	22 May 2024, 09:00 - Thursday 23 May 2024, 17:00 (CEST)	Austria	https://year-of-skills.europa.eu/events-and-activities/stronger-together-fostering-transnational-cooperation-applied-universities-2024-05-22_en
European Year of Skills	ENFUSE Finals - Enterprise & Education	22 May 2024, 09:00 - 17:00 (CEST)	Ireland	https://year-of-skills.europa.eu/events-and-activities/enfuse-finals-enterprise-education-2024-05-22_en

Figure 2 - Details information about the events

The calendar will be kept updated by all partners, during the project duration.

4. What could the project do for you?

Common approaches to developing and using micro-credentials at the EU level can support and enhance national efforts for their quality, transparency, cross-border comparability, recognition, and portability. It can also help to build trust in micro-credentials for the benefit of the learners, employers, and education and training institutions.

4.1 Benefit for learners

Individualized Learning – Students in production industries can choose and test individual Competence Units (CUs), building personalized MCs that can eventually lead to a national qualification, or a recognized European Diploma.

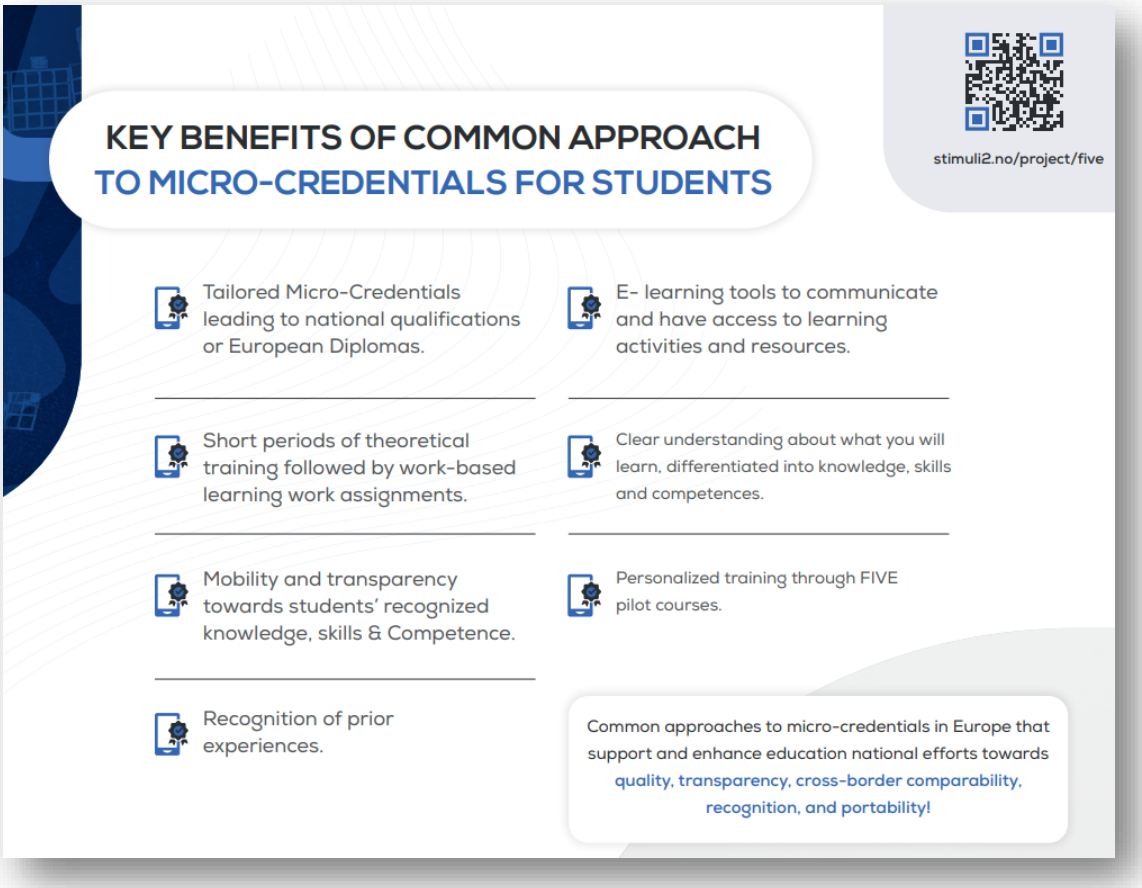


Figure 3 - Benefits for learners (source: Five Flyer)

4.2 Benefit for employers

Industry-Driven Development – A bottom-up approach will be applied to establish regional or national Skills Foresight Forums, bringing together industry and educators to design high-quality CUs and MCs aligned with current needs.



Figure 4 - Benefits for companies (source: Five Flyer)

4.3 Benefit for education and training institutions

Collaborative Learning – VET providers will collaborate based on a "Shared Framework of Learning Outcomes" (SFLOs) underpinned by an industry-led Common Competence Framework. The SFLOs will ease the recognition of qualification equivalencies, assisted by the European Credit System for Vocational Education and Training (ECVET) and the European Skills Agenda. This collaboration will facilitate:

* Development of learning resources
* Assessment processes
* Pedagogy

- Learner mobility
- Shared delivery by VET specialists and industry experts contributing to a unitized and modernized VET delivery system, where CUs and MCs will be designed, shared, and maintained nationally and transnationally within Europe.

Flexible and Adaptable – New work-based learning pedagogies, digital learning resources, and tools will allow for a "blended" approach, combining work-based methods with alternative VET delivery methods. Also, each country can adapt the system to their specific needs and existing structures, ensuring complementarity with ongoing initiatives.

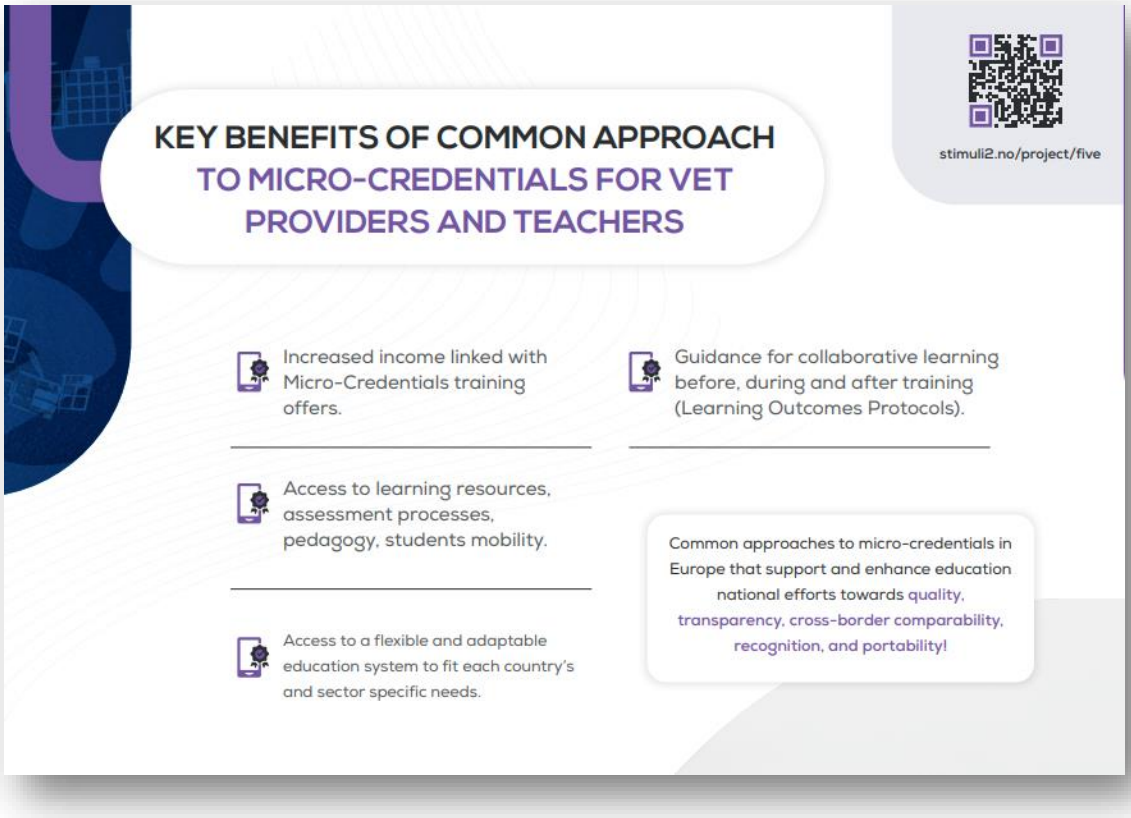


Figure 5 - Benefits for VET providers (source: Five Flyer)

Additional guides and promotional material linked with the advantages of MCs can be found in the annex section 8:

- What can FiVE do for you? - https://stimuli2.no/sites/default/files/2024-08/D2.2-What_Can_Five_Do_for_You_compressed.pdf
- Five in nutshell for the fabrication industry - https://stimuli2.no/sites/default/files/2024-08/D2.2-Five_in_a_Nutshell_v1.pdf

- Introduction to blended learning - https://stimuli2.no/sites/default/files/2024-08/D2.2-Five_in_a_Nutshell_v2_blended_learning.pdf
- What could be the goals of Five for the fabrication industry? - https://stimuli2.no/sites/default/files/2024-08/D2.2-Five_in_a_Nutshell_v2_goal_0.pdf

5. Work-based learning resources

Work-Based Learning (WBL) is an educational approach that integrates structured, practical training within the workplace or workshop environment, combining theoretical knowledge with hands-on experiences. This approach prepares learners for real-world job tasks by enabling them to practice and refine their skills in a professional setting. In the context of the FiVe project, work-based learning is used to describe its structured training programs, designed to support learners by preparing them for industry-specific roles while giving VET providers and industry representatives a framework to develop a workforce that meets current and future skill demands.

FivE project will offer a variety of WBL resources tailored and designed to enhance MCs and CUs by aligning training content closely with industry needs in aquaculture and welding/inspection. Thus, supporting learners, instructors, and industry representatives. These resources aim to enhance learning experiences by integrating technology, case studies, and reflective practices to create comprehensive, real-world training scenarios. The following are examples of key WBL resources that will be developed under WP5, with all materials made accessible on the project website to promote widespread access and use:

- **Competence Unit (CU) Training Guides:** These guides will outline the specific competencies and objectives associated with each CU, providing a roadmap for learners and trainers to follow.
- **Digital e-Portfolios:** Learners will be encouraged to develop e-portfolios to document their progress, reflections, and completed tasks.
- **Interactive Learning Modules:** Modules that combine theoretical and practical content reinforcing practical skills by allowing learners to engage with content in a way that mirrors real workplace scenarios.
- **Scenario-Based Exercises:** Developed to address industry-specific challenges, scenario-based exercises present learners with realistic problems they may encounter on the job. These exercises encourage learners to apply critical thinking, problem-solving, and technical knowledge in a controlled environment, reinforcing their understanding through practical application.
- **Assessment Templates for Work-Based Learning:** Standardized templates for assessing learner performance provide trainers with a framework for evaluating competencies consistently across various learning environments.

The FiVE work-based learning resources will offer valuable tools for enhancing skill acquisition in vocational education. By enabling learners to engage deeply with industry-specific tasks and scenarios, these resources will support the development of a more skilled and adaptable workforce, contributing to both personal career growth and industry advancement across Europe.

6. Practical Cases / Examples of Micro-Credentials

Competence Units (CUs) and Micro-credentials are correlated concepts within the framework of education and training, particularly in the context of upskilling and reskilling the European workforce.

A CU consist of a coherent set of knowledge and skills, organized in learning outcomes and minimum or recommended workload, that can be individually assessed and validated. It focuses on a limited learning outcome within a broader competency area. While the Micro-credential is a formal recognition awarded upon successful completion of one or more CUs. Micro-credentials validate an individual's achievement of a specific set of knowledge and skills.

Both CUs and Micro-credentials promote targeted learning focused on obtaining specific and in-demand skills; as well as flexibility once, learners can decide which Micro-credentials and CUs to complete at their own pace. Micro-credentials and CUs also offer stackable skills that can be combined to demonstrate broader competencies, leading to a new type of an International Micro Specialized (IMiS) qualification that is not going to replace or compete with the existing National Qualification frameworks or International Diplomas, such as the ones awarded by EWF. This involves recognizing acquired skills for employers or further education.

This chapter provides examples of CUs design for manufacturing (Welding and Additive Manufacturing) and fish farming industries.

6.1. Additive Manufacturing Sector - EWF approach to harmonised CUs

Within EWF´s qualifications[2], there are two types of Competence Units:

- **Cross-cutting Competence Unit -** A competence unit whose learning outcomes are not directly linked with one job function since the knowledge and skills achieved will be mobilized in several job functions and activities. CU 00 “Additive Manufacturing Processes Overview” (Figure 6) is an example of CU covering the general knowledge and skills about all AM processes, which is part of all AM Training profiles.

[2] European Welding Federation (ewf.be)

CU 00: Additive Manufacturing Processes Overview	RECCOMMENDED CONTACT HOURS
SUBJECT TITLE	
Directed energy deposition	0,5
Powder bed fusion	0,5
Vat photopolymerization	0,5
Material jetting	0,5
Binder jetting	0,5
Material extrusion	0,5
Sheet lamination	0,5
Total	3,5
WORKLOAD	**7**

Learning Outcomes – CU 00: Additive Manufacturing Processes Overview	
KNOWLEDGE	Basci factual knowledge of theory, principles and applicability of: – Directed energy deposition – Powder bed fusion – Vat photopolymerization – Material jetting – Binder jetting – Material extrusion – Sheet lamination
SKILLS	Distinguish parts produced by different AM processes List the advantages and limitations of AM processes from a manufacturing process chain point of view Name the applicability of different AM processes, according to the characteristics of each process

Figure 6 Example Cross-cutting CU

- **Functional Competence Unit** - A competence unit whose learning outcomes are directly linked with at least one job function and in which the knowledge and skills achieved will be mobilized in specific job functions and related activities. CU 18 “Hardware, Software and Build File Set-up for PBF-LB” (Figure 7) is an example of CU that covers the specific training for AM Operator, who’s main function is to fit and set-up the AM Machine (3D printer) hard and software, thus being specific within for the AM PBF-LB Operator training.

CU 18: Hardware, software and build file set-up for PBF-LB	RECOMENDED CONTACT HOURS
SUBJECT TITLE	
PBF-LB machine set-up requirements	4
Pre-build check list	3
Consumables, feedstock & substrate	3
Build files	1
Work documentation	2
Practical implementation of HSE procedures (while fit and set up the machine)	1
Total	**14**
WORKLOAD	**28**

CU	EQF/ EWF LEVEL	JOB FUNCTIONS	JOB REQUIRED ACTIVITIES	CONTACT HOURS	WORKLOAD
Hardware, software and build file set-up for PBF-LB	**4 Independent**	Fit and set-up hardware, software and build file for PBF-LB	Verifying the PBF-LB system set-up according to the procedure determined by the machine manufacturer and required operational conditions	**14**	**28**
			Preparing and verifying the build substrate and feed-stock conditions		
			Performing: build file loading, process preparation, process starts, in process observation and mal func-tion detection and mitigation		
			Build observation		
			Following HSE procedures during machine and build file set-up		

Learning Outcomes – CU 18: Hardware, software and build file set-up for PBF-LB	
KNOWLEDGE	Factual and broad knowledge of: – Variables of PBF-LB and related operational conditions parameters – PBF-LB equipment requirements – Materials used for PBF-LB – Type of files and work documentation – HSE procedures under PBF-LB
SKILLS	Prepare the machine for operation, according to the AM procedure specification Prepare the feedstock, build platform and the machine in accordance to the material being used Verify if the PBF-LB machine complies with the machine manufacturer and/or internal specifications Load files to PBF-LB machines Verify if the PBF-LB machines are working in accordance with the job specification, in terms of process parameters Comply with HSE procedures associated to PBF-LB machines Interpret technical information related to the PBF-LB process and machines

Figure 7 Example Functional CU

The expected learning outcomes are described in detail for each type of competence unit in terms of knowledge and skills, and which for functional CU are also organized in **job functions and related activities** in addition to knowledge and skills, corresponding to a specific proficiency level within EWF´s Systems Framework levels.

On each Competence Unit, objectives and scope are defined for a specific depth of knowledge and skills. Recommended contact hours are distributed between theoretical (A), assigned projects/exercises (B), practical workshop training(C), as showed in the following example:

Qualification: Example 1	
RECCOMMENDED CONTACT HOURS	**X = SUM (A:C)**
Subject Contents	A + B + C

Figure 8 Recommended contact hours – distribution

6.2. Welding Sector - 1090 Inspection CUs

*The in-company training paths for **Continuing VET micro-courses,** apply the sequence:*

- Which Competence(s) are needed ?

- ***To be supported by provision of sufficient Knowledge and work-based Skills that let the staff acquire this competence.***

Through European regulations for construction, the harmonized standard EN 1090 - 1 has been introduced in recent years, which is the mandatory content of every metal structure built in the European Union. The guideline itself also covers inspection, several different completed activities, such as plan review, welding, anti-corrosion seals, NDT control, and others.

In Europe, there is still no regulated training for 1090 inspectors. The very principle of training, due to several completed topics, promises the possibility of dividing it into small pieces that can be treated as microcredits.

This section covers the example of the Welding topic within EN 1090 standard that has been developed as a reference and test course.

Example. CU Name: Continuing VET in Welding

Content: This CU covers the subject of welding processes in accordance with the EN 1090 standards. The CU includes the preparation of materials and components, welding procedures, and post-welding inspections. It also covers essential safety measures and the documentation required for compliance with the EN 1090 standards.

General learning outcomes:

Competences: ***The candidate should be able to***

- Select appropriate welding methods for different materials and product requirements
- Develop and implement welding procedure specifications (WPS)
- Apply appropriate pre-welding and post-welding inspections
- Ensure compliance with EN 1090 standards
- Develop corrective action plans for defects identified during the welding process
- Document welding processes, inspections, and repair reports in accordance with EN 1090

Knowledge: ***The candidate should have knowledge of***

- Understanding the principles of welding as per EN 1090
- Describing the types of welding processes and their applications
- Following the standard operating procedures for welding materials
- Being familiar with the pre-welding, during-welding, and post-welding inspection stages
- Understanding the types of welding defects and their causes
- Reading and interpreting welding procedure specifications (WPS)
- Understanding and apply the ISO 6520 standard in identifying welding defects
- Producing the documentation required for EN 1090 compliance

Skills: ***The candidate will be able to***

- Know the differences between various welding methods (MIG, TIG, MMA, etc.)
- Identify and prevent potential welding defects
- Understand and apply the ISO 6520 standard for identifying welding deviations
- Conduct post-weld heat treatment and inspect results
- Differentiate between critical, major, and minor defects
- Document welding procedures and inspections according to EN 1090
- Review welding qualification reports and determine their validity

The specific learning outcomes will be structured in a similar way.

6.3. Fish farming sector –Aquaculture CUs

*The training paths for **Basic VET courses** leading to a National Qualification or an International Diploma, applies the sequence:*

Knowledge ——> Skills ——> Competence

Example: CU Name: 5.00 Fish Welfare

Content: Participants will gain a good knowledge of different diseases in aquatic organisms, anatomy and normal behavior.

General learning outcomes:

Knowledge: ***The candidate should have knowledge of***

- Planning and carrying out work in aquaculture facilities in line with current regulations for HSE (health, safety and environment).
- Describing the importance of good cage maintenance and cleaning/maintaining of equipment used in the aquaculture industry and in accordance with procedures and regulations.
- Explaining the environmental factors in the aquatic environment and assess the factors based on the species' environmental requirements and tolerance limits.
- Assessing the behavior, appearance and state of health of aquaculture organisms and implement measures in line with regulations for preventive health work and animal welfare.
- Discussing how aquaculture activities can be run in coexistence with other activities and interests.
- Understanding the quality control and monitoring in aquaculture.
- Reflecting on how the operation of an aquaculture facility affects fish welfare and the environment, and how the operation can contribute to added value.
- Handling dead aquaculture organisms in accordance with current regulations.
- Husbandry of aquaculture organisms in line with animal welfare principles.
- Assessing the health and welfare status of various aquaculture species and implement necessary measures.
- Registering, monitoring and interpreting aquatic environment parameters and implement necessary measures.
- Taking samples of aquaculture organisms and fish feed for further analysis.
- Applying contingency plans and notification routines according to the company's organization.

Skills: ***The candidate will be able to***

- Complete the Fish Welfare course.
- Learn the Welfare Indicators.
- Exercise a high ethical standard.
- Read and understand the description of "Infection screening tests»

Competence: ***The candidate should be able to***

- Detect indications of good/bad Fish Welfare.
- Conduct a dialogue with the supervising veterinarian regarding fish health.
- Detect changes in relation to welfare indicators.
- Apply welfare indicators.
- Manage a system for dead fish handling.

The specific learning outcomes will be structured in a similar way.

6.4. FivE Project CUs structure

The Five project develops recommended harmonized minimum standards containing specifications for how to:

- transfer the syllabus and the curriculum into a short description of the content, including high level descriptions of the desired measures for competence
- specify Learning Outcomes (LOs) structured into
    - General Learning Outcomes (GLO) descriptions that transforms the syllabus and the curriculum into brief, clear and specific measurable statements addressing and specifying measures for knowledge, skills and competences
    - Special Learning Outcomes (SLO) descriptions that transforms the GLO into the operational level, by specifying measures for knowledge, skills and competences
- provide a system solution that let VET and Higher VET providers cooperate and collaborate about developing, sharing and using harmonized digital libraries containing courses that are applying standardized Competence Units (CUs)
- learn to write GLO- and SLO descriptions by specifying
    - Knowledge: The candidate should have knowledge of …..
    - Skills: The candidate will be able to .....
    - Competences: The candidate should be able to …..

7. Practical examples of Cooperation for Skills foresight

Cooperation for Skills Foresight involves the collaboration between governments, educational institutions, and industries, which is vital for effectively navigating the green transition. By working together, these entities can anticipate future skill needs within specific industrial sectors. For example, governments can partner with industry leaders to identify the specific skills needs, gaps and skills shortages that will be most in demand. This information can then be shared with educational institutions, allowing them to tailor their curriculums and training programs to equip future generations with the necessary skills-set.

Additionally, collaboration can facilitate knowledge exchange between sectors. Universities with expertise in environmental science can share their knowledge with engineers working in traditional industries, accelerating the integration of sustainable practices. Through such cooperation, skills foresight ensures a future workforce that is prepared to address environmental challenges and drive a successful green transition.

This chapter provides examples of Cooperation for Skills Foresight for manufacturing (Welding and Additive Manufacturing) and fish farming industries, showcasing how this cooperation is structured (bodies involved) and which outcomes have been produced.

8.1. Bridges – Skills Foresight Forum (Norway)

Within the Bridges project, the first attempt of establishing National Skills Foresight Forum was achieved. This foresees the collaboration between VET providers supported by a ‘Shared Framework of Learning

Outcomes' underpinned by an industry led Common Competence Framework, to inform the collaborative development of learning resources, assessment processes and pedagogy. The established structure eases the recognition of qualification equivalencies, assisted by shared delivery by VET specialists and industry experts, contributing to a unitised and modernised VET delivery system, that can be shared both nationally and transnationally.

The goal of a SFF is to provide a "platform" where stakeholders meet regularly to plan that their workforce has the skills and knowledge needed to meet the evolving demands of the economy at local, regional and national levels.

The ultimate goal of such membership, composed by Fish farming companies, SME representatives and VET providers, is to ensure a strong linkage between education and innovative VET development, where members can anticipate problems, influence the devilment and help selecting priorities and for local business innovation

8.2. EWF Working groups

The EWF Working Groups (WGS) establishment, results from the initiative of putting up to a vote between all the EWF members, if the development of a new educational system is in the best interest of all the partners. If the majority is in favour, then, the members form a work group that further develops the system and its guidelines. The workgroup always comprises of its initiator and competent members who have a personal interest in the further development. The group always invites to join the group different competent stakeholders from the industry. Sometimes working groups have tasks from wider international interest therefor they are organized under IIW/EWF International Authorization Board IAB like: Welder Guideline group, Inspection Personnel Guideline group, Welding Structure Designer Guideline group and many others.

The EWF Working Group on Training Development focuses on enhancing skills and competencies within the welding industry. Its primary objectives include:

1. Curriculum Development: Creating standardized training programs and curricula that meet industry needs and align with European standards.

2. Certification Schemes: Establishing certification processes to validate the skills of welding professionals, ensuring consistency and quality across different countries.

3. Best Practices: Sharing best practices in training methodologies, promoting effective teaching techniques and assessment strategies.

4. Industry Collaboration: Engaging with industry stakeholders to identify skill gaps and future needs, ensuring training remains relevant and up to date.

5. Continuing Education: Promoting lifelong learning opportunities for professionals to keep their skills current in an evolving industry.

The EWF Working Group on Training Development typically follows a structured process to enhance training initiatives. Here are the key steps involved:

1. Needs Assessment: Identify current skill gaps and future needs in the welding industry through surveys, industry feedback, and market analysis.

2. Curriculum Design: Develop standardized training curricula that address the identified needs, incorporating both theoretical and practical components.

3. Training Materials Development: Create or update instructional materials, including manuals, presentations, and online resources, to support the curriculum.

4. Pilot Programs: Implement pilot training programs in selected organizations to test the curriculum and materials, gathering feedback for improvement.

5. Certification Development: Establish assessment criteria and certification processes to evaluate trainees' competencies and ensure quality standards.

6. Stakeholder Engagement: Collaborate with industry partners, educational institutions, and regulatory bodies to align training with industry requirements and promote acceptance of the programs.

7. Implementation: Roll out the training programs across various educational and training institutions, ensuring proper instructor training and resource availability.

8. Monitoring and Evaluation: Continuously assess the effectiveness of the training programs through feedback, performance metrics, and industry outcomes to make necessary adjustments.

9. Ongoing Development: Update curricula and materials regularly to reflect advancements in technology and changes in industry standards, ensuring the training remains relevant.

8.3. Councils – Additive Manufacturing Observatory

The European Additive Manufacturing (AM) Observatory was created in the scope of the SAM – Sector Skills Strategy in Additive Manufacturing (2019-2023) project that aimed to put into practice a methodology for a smart, sustainable, and inclusive growth of the AM Sector in Europe.

The goal of the **AM Observatory**[3] is to provide up to date data on AM skills needs and trends, as well as to monitor a broader scope of AM related initiatives, which are in demand by the labour market within the European and National landscapes.

[3] https://www.skills4am.eu/observatory_about.html

The AM Observatory undertakes the continuous assessment of current and future skills needs in AM, providing real-time mapping and monitoring of AM industry needs, technological trends, skills shortages, and mismatches, as well as policies and figures for AM.

The AM Observatory collects and analyses data through a forecast methodology for identification and the AM Observatory councils for qualification (IAMQC) and industry (IAMIC) were settled as pillars for the sector skills strategy deployment.

With SAM end, the IAMQC continued to invite new members to the Council. However, external organizations can also ask to join the IAMIC. Moreover, the European AM Observatory Management team can suggest to the IAMIC new potential members.

The Observatory Platform (https://www.skills4am.eu/iamqs.html) is updated with new functionalities, such as: AM Qualifications; Training Network/Training Centres within the IAMQS; Training Offers (directly linking to digital tool with list of IAMQS ATBs), “Find your Path” – an assessment query for general public and Job Offers (with link to online form to upload an offer), as well as the call for experts and calls for funding were added. The AM skills data, resulting from the auscultation, was updated into the “AM Market World” “Skills” and “Analysis”. Moreover, the external initiatives and AM projects, include a form to continuously be able to identify new Initiatives.

8. Annex

- What can FiVE do for you? - https://stimuli2.no/sites/default/files/2024-08/D2.2-What_Can_Five_Do_for_You_compressed.pdf
- Five in nutshell for the fabrication industry - https://stimuli2.no/sites/default/files/2024-08/D2.2-Five_in_a_Nutshell_v1.pdf
- Introduction to blended learning - https://stimuli2.no/sites/default/files/2024-08/D2.2-Five_in_a_Nutshell_v2_blended_learning.pdf
- What could be the goals of Five for the fabrication industry? - https://stimuli2.no/sites/default/files/2024-08/D2.2-Five_in_a_Nutshell_v2_goal_0.pdf
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Figure 9 What can FiVE do for you? - https://stimuli2.no/sites/default/files/2024-08/D2.2-What_Can_Five_Do_for_You_compressed.pdf

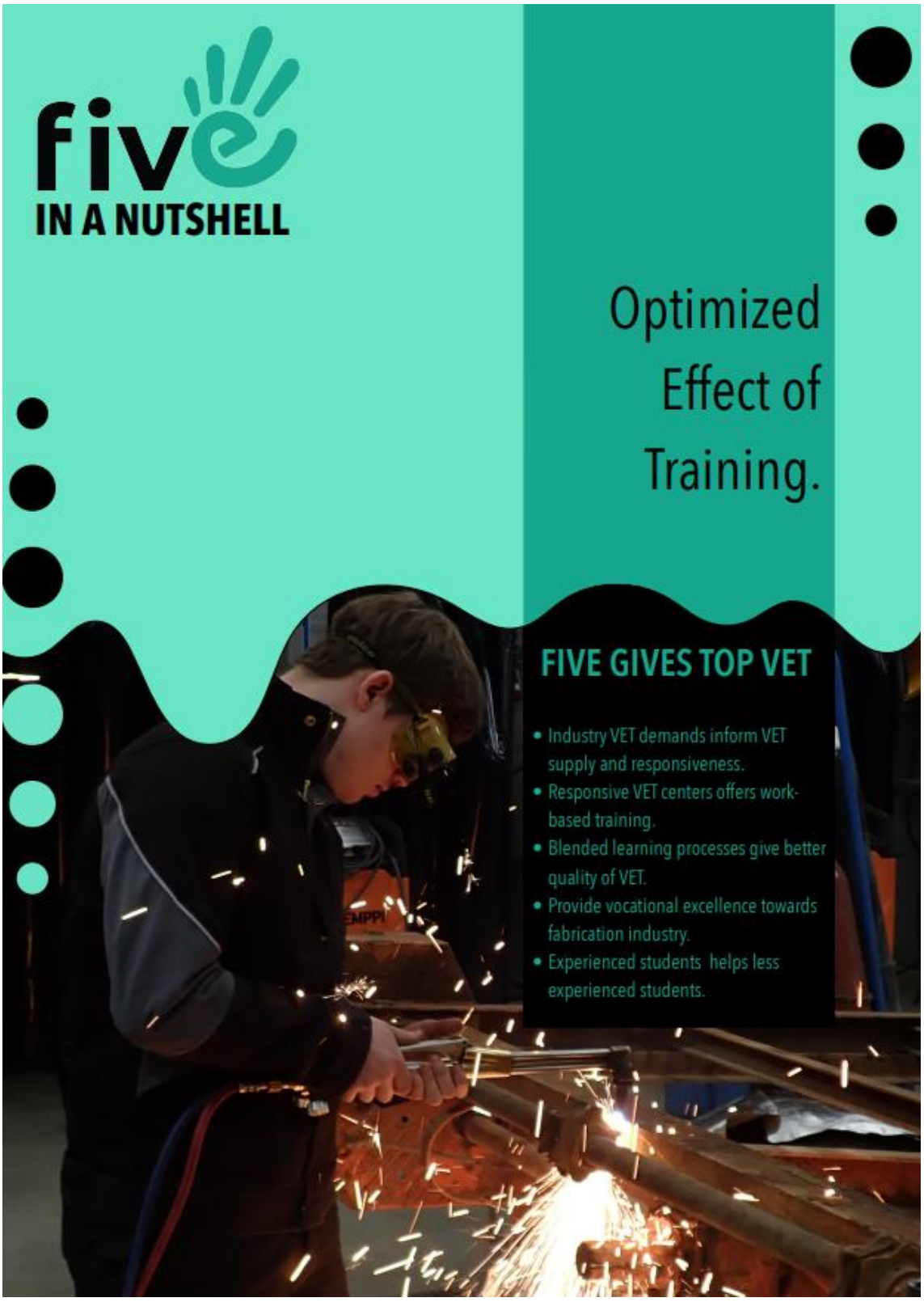


Figure 10 Five in nutshell for the fabrication industry - https://stimuli2.no/sites/default/files/2024-08/D2.2-Five_in_a_Nutshell_v1.pdf



A VENUE THAT IS COMBINING THEORY WITH PRACTICE IN NEW WAYS

The work-based learning applies international recognized learning outcomes descriptions :

- What knowledge, skills and competence are wanted ?

to create improved mastering experiences for the students:

- By knowing what students already know , or don't know

WHAT

- Develop VET supply to better offer training based up on industry demands.
- Students receive more efficient production related training.
- Introduce new VET methods that are more time and cost-efficient.
- Establish school-industry partnerships.

Thus, Five streamlines VET. They are the initiators for organizing a common meeting arena towards the industry.

WHY

- To challenge the fabrication industry to formulate their VET demands and specifications.
- To demonstrate how VET schools may set up , establish and deliver blended learning solutions that quickly responds to industry demands.
- The training methods apply active learning principles that are combining cases , modern teaching tools, and interactive learning services that highlight , demonstrate and initiate discussions among the students.

Fabrication industry are challenged to formulate their VET demands and specifications.

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Figure 11 - Introduction to blended learning - https://stimuli2.no/sites/default/files/2024-08/D2.2-Five_in_a_Nutshell_v2_blended_learning.pdf


INTRODUCTION TO
BLENDED LEARNING
To provide a clear timetable:
The course may be structured in weeks that follow the topic. Problem based learning supports weekly activities for the students. Power Point slides don't work.
Designing the online learning activities: Select those that are most appropriate for the class learning outcomes. Teaching should reflect that internet today is part of the everyday activities in the society.
Criteria for success:
How appropriate are the learning activities and the chosen technologies for the learning context? How well are they integrated into the learning process?
Effective teaching experiences:
It is important that there is a strong alignment between the planned learning outcomes and the learning activities that intend to help developing students' achievement of those.
Factors to consider:
• What are the intended learning outcomes ?
• The situation for the students; where are they located, number, access to work-based training etc.
• Technical requirements related to course content and the previous learning experiences.
• Has the teacher a broad and deep previous online experience?

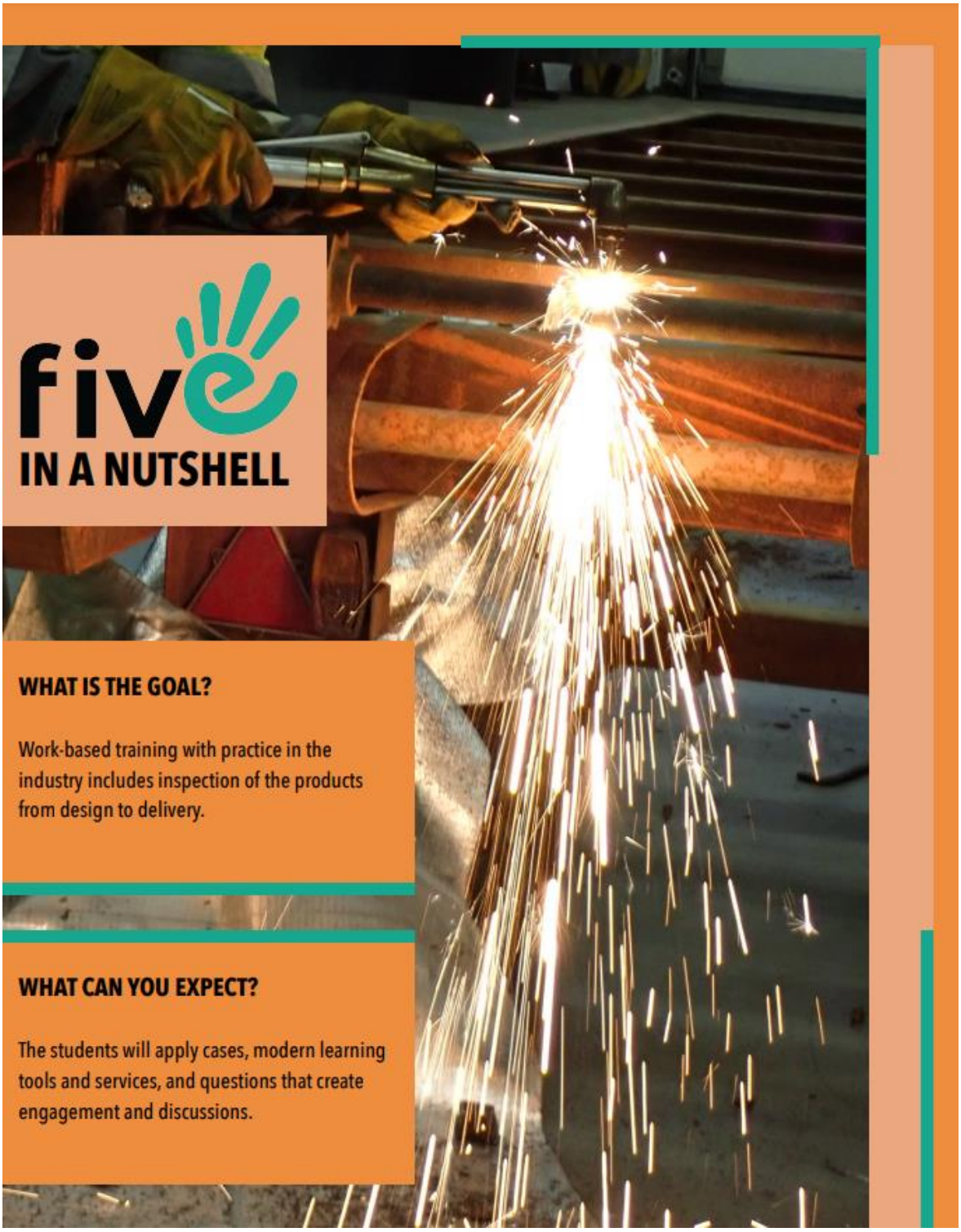


Figure 12 - What could be the goals of Five for the fabrication industry? - https://stimuli2.no/sites/default/files/2024-08/D2.2-Five_in_a_Nutshell_v2_goal_0.pdf



THE TRAINING METHODS

Prior to the course(s) the vocational education and training (VET) school establishes a school-industry partnership together with the companies. This includes a plan for the training needs of the company.

The training is delivered as problem based learning, where an external customer delivers a set of specifications to the class and asks them whether they can deliver an inspection solution based up on the specifications.

The training follows the industrial production process. Theoretical knowledge is immediately transferred into work-based learning.

1. RECCOGNITION OF PRIOR LEARNING

Knowing what students already know, or don't know! Pre-testing of knowledge before and during the course to optimize the effect of training.

2. ON-SITE TRAINING

Experienced students help less experienced students. The students apply different cases and questions that create engagement and discussions.

3. e-LEARNING TOOLS

All students participate and use their mobile device to give nearly instant feedback. The students receive efficient training that develops, aggregates and systemizes knowledge.

4. WORKED-BASED LEARNING

Create improved mastering experiences. The students apply work-based training during their practice in the industry. This includes inspection of the product(s).

5. VET WITH VIDEO

Students learn in a better way from their peers. The student receives some of the training by using video. This gives considerable time- and cost-efficient training.

KNOWING WHAT THE STUDENTS ALREADY KNOW , OR DON`T KNOW, TO CREATE MASTERING EXPERIENCES FOR THE STUDENTS

Co-funded by the Erasmus+ Programme of the European Union

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