DRIVES

Development and Research on Innovative Vocational Education Skills

Advanced Manufacturing Press Line Set-Up

Job Role Skill Set

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INTRODUCTION

1.1 OBJECTIVE

The objective of this deliverable is to provide an introduction to described Job Role within the applied skills definition model.

1.2 PURPOSE OF THE DELIVERABLE

The purpose of this deliverable is to define skills definitions of the Advanced Manufacturing Press Line Set-Up role within the ECQA skills definition model.

1.3 SCOPE OF THE DELIVERABLE

The deliverable contains

- Description of the content of the Job Role
- Description of used Skill Sets and skills definitions, coverage of Qualification Schemas

The deliverable does not cover:

- Course development, as this will be done after the skill definitions clearly outlined the set of required courses.

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2 ECQA SKILLS DEFINITION MODEL

A skills definition contains the following items (see Fig. 1):

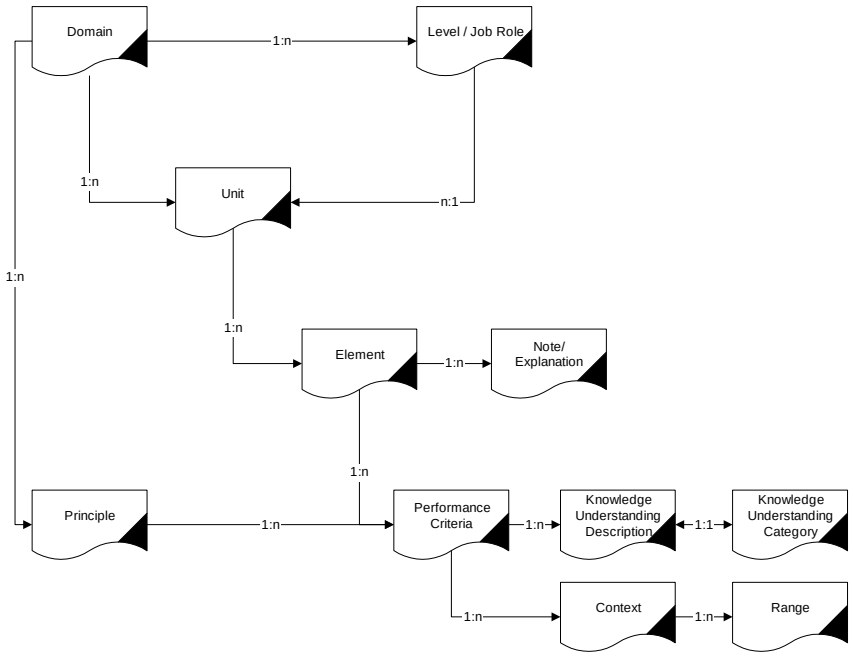


Figure 1 The Skill Definition Model (1:n = one to many relationship)

Context: A category of ranges; it represents some terminology used in a performance criterion that consists of different context, conditions or circumstances. A participant must be able to prove competence in all the different circumstances covered by the context.

Domain: An occupational category, e.g. childcare, first level management or software engineering.

Element: Description of one distinct aspect of the work performed by a worker, either a specific task that the worker has to do or a specific way of working. Each element consists of a number of performance criteria.

Evidence: Proof of competence.

Knowledge and understanding category: A category of knowledge and understanding descriptions.

Knowledge and understanding description: A description of certain knowledge and understanding. To be judged competent in a unit a participant must prove to have and to be able to apply all the knowledge and understanding attached to it.

NVQ (UK based): The National Vocational Qualification standard of England, Wales and N. Ireland.

Performance criterion: Description of the minimum level of performance a participant must demonstrate in order to be assessed as competent. A performance criterion may have relevant contexts.

Principle: A statement of good intentions; it underpins all competent domain practice.

Range: Description of a specific circumstance and condition of a performance criterion statement.

Qualification: The requirements for an individual to enter, or progress within a certain occupation.

Job Role: A certain profession that covers part of the domain knowledge. E.g. domain = Functional Safety, job role = Functional Safety Manager.

Unit: A list of certain activities that have to be carried out in the workplace. It is the top-level skill in the UK qualification standard hierarchy and each unit consists of a number of elements.

The rationales for developing the ECQA skills definition model is based on the skills definition proposed by the DTI (Department of Trade and Industry) in the UK for the NVQ (National Vocational Qualification) standards. These models have been re-used and slightly modified by other countries when they started employing skill cards [1], [2].

ECQA standards are used to describe the skills sets delivered within the DRIVES project (www.project-drives.eu). Further description and rationales are attached in annexes of this document. The ECQA structure was mapped in DRIVES project to DRIVES Reference and Recognition Framework with the links to ESCO[7], EQF[8], ECTS[9] and ECVET[10]. See more in deliverable DRIVES-D4.1.1 Reference and Recognition Framework – Analysis.pdf (www.project-drives.eu).

3 SKILLS DEFINITION FOR THE JOB ROLE "ADVANCED MANUFACTURING PRESS LINE SET-UP"

3.1 THE SKILLS HIERARCHY

Using the terminology outlined in the skills definition model and including the skills identified during the demand analysis at the beginning of the project, the following skills hierarchy for the job role " Advanced Manufacturing Press Line Set-Up " has been designed.

Unit ID	Unit Name	Element ID	Element Name
AMPLS.U1	Introduction	AMPLS.U1.E1	Hot Stamping
		AMPLS.U1.E2	Medium Line
		AMPLS.U1.E3	Types of Lines
AMPLS.U2	PRESS basic	AMPLS.U2.E1	Press Mechanics
		AMPLS.U2.E2	Basic Hydraulics
		AMPLS.U2.E3	Electrical Diagram
		AMPLS.U2.E4	PLC Basic
		AMPLS.U2.E5	Monitoring
AMPLS.U3	Robotics ABB/Destacker	AMPLS.U3.E1	Feeder
		AMPLS.U3.E2	Line Monitoring
AMPLS.U4	PRESS ADVANCED	AMPLS.U4.E1	Advanced Hydraulics
		AMPLS.U4.E2	Advanced Programming
		AMPLS.U4.E3	Advanced Monitoring
AMPLS.U5	Set-up and maintenance	AMPLS.U5.E1	Set-Up
		AMPLS.U5.E2	Maintenance and Troubleshooting with Monitoring

Figure 2 The Skills Set for Advanced Manufacturing Press Line Set-Up

3.2 THE SKILLS DESCRIPTIONS – JOB ROLE ADVANCED MANUFACTURING PRESS LINE SET-UP (AMPLS)

Domain Acronym: Engineering

Domain title: Advanced Manufacturing Press Line Set-Up

Domain Description:

The training project presented here aims to equip students and future workers with the knowledge required to integrated a Press Line, give support in a production line and repair any issue in a production line. With new data tools understand a production line and prevent future issues.

3.3 AMPLS UNIT 1: BASIC STAMPING

Acronym: AMPLS.U1

Title: Foundations to Quality and Metrology

Description:

The first training Element introduces the subject of Metrology, with a particular focus on issues related to the Quality data and information available, for which the concept of "Uncertainty" is key and never completely divisible from the very same act of measurement, but can be put under control if both directly controllable and external conditions are known and its influence properly analysed.

3.3.1 AMPLS Unit 1 - Element 1: Hot Stamping

Acronym: AMPLS.U1.E1

Element Title: Hot Stamping

Element Note:

This Element gives an overview of the Hot Stamping technology. Describe the different parts in a Hot Stamping line.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U1.E1.PC1	The student has a basic understanding of Hot Stamping process
AMPLS.U1.E1.PC2	The student is able to identify a Hot Stamping Line

Table 1: Performance Criteria for the Element AMPLS.U1.E1

3.3.2 AMPLS Unit 1 - Element 2: Medium Line

Acronym: AMPLS.U1.E2

Element Title: Medium Line

Element Note:

This element is the first step inside different press sizes

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U1.E2.PC1	The student learn that we can find different size/kind of presses depending of needs of the market

Table 2: Performance Criteria for the Element AMPLS.U1.E2

3.3.3 AMPLS Unit 1 - Element 3: Types of Lines

Acronym: AMPLS.U1.E3

Element Title: Types of Lines

Element Note:

This last part of the first block give to the students a general view of the different types/sizes of lines that the manufacturer can build. Try to understand the reason of each one.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U1.E3.PC1	The student, once she/he has understood the concept of the Stamping must be able to identify the type of line
AMPLS.U1.E3.PC2	The student understands the differences stamping technologies

Table 3: Performance Criteria for the Element AMPLS.U1.E3

3.4 AMPLS UNIT 2: PRESS BASIC

Acronym: AMPLS.U2

Title: Press Basic

Description:

This Unit is a review of basic knowledge of, mechanics hydraulics, electricity, PLC and new tool, monitoring, very useful nowadays to read data and learn more about machines. Those basic knowledge of different subject give to the student different tools to understand the lines.

3.4.1 AMPLS Unit 2 – Element 1: Press Mechanics

Acronym: AMPLS.U2.E1

Element Title: Press Mechanics

Element Note:

This Element give to the student a general view of the press and also work on detail the different main parts of a press. Make reference on the most important and structural elements.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U2.E1.PC1	The student is able to recognise the main different parts of a press

Table 4: Performance Criteria for the Element AMPLS.U2.E1

3.4.2 AMPLS Unit 2 – Element 2: Basic Hydraulics

Acronym: AMPLS.U2.E2

Element Title: Basic Hydraulics

Element Note:

This Element is a review of the different hydraulic elements that there is in the market and what are they using for. Student learn reading a hydraulic diagram and design basic diagrams.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U2.E2.PC1	The student is able to identity main hydraulic elements and understand for what is using it
AMPLS.U2.E2.PC2	The student is able to read a hydraulic diagram
AMPLS.U2.E2.PC3	The student is able to create a basic diagram

Table 5: Performance Criteria for the Element AMPLS.U2.E2

3.4.3 AMPLS Unit 2 – Element 3: Electrical Diagram

Acronym: AMPLS.U2.E3

Element Title: Electrical Diagram

Element Note:

This Element is a review of the different electrical elements that there is in the market and what are they using for. Student learn reading an electrical diagram.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U2.E3.PC1	The student is able to identity main electrical elements and understand for what is using it
AMPLS.U2.E3.PC2	The student is able to read a electrical diagram

Table 6: Performance Criteria for the Element AMPLS.U2.E3

3.4.4 AMPLS Unit 2 – Element 4: PLC Basic

Acronym: AMPLS.U2.E4

Element Title: PLC Basic

Element Note:

This Element is an intro and basic knowledge of the program that the press brain is built. Siemens (TIA Portal)

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U2.E4.PC1	The student is able to programme with TIA Portal
AMPLS.U2.E4.PC2	The student is able to use the commands of TIA Portal
AMPLS.U2.E4.PC3	The student is able to create understand/modify a programme

Table 7: Performance Criteria for the Element AMPLS.U2.E4

3.4.5 AMPLS Unit 2 – Element 5: Monitoring

Acronym: AMPLS.U2.E5

Element Title: Monitoring

Element Note:

This Element is an intro in the monitoring world. The student starts learning the tool to take data and understand this data feedback

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U2.E5.PC1	The student is able to understand the monitoring data tool

Table 8: Performance Criteria for the Element AMPLS.U2.E5

3.5 AMPLS UNIT 3: AUTOMATION

Acronym: AMPLS.U3

Title: Automation

Description:

The present Unit works the different parts of a press line that are automated, robot, destacker and feeder.

3.5.1 AMPLS Unit 3 – Element 1: Robotics ABB/Destacker

Acronym: AMPLS.U3.E1

Element Title: Robotics ABB/Destacker

Element Note:

This Unit provides basic knowledge to control an ABB robot, program, take points, change trajectory. Intro in a Destacker world

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U3.E1.PC1	The student is able to program a ABB robot, trajectory and points
AMPLS.U3.E1.PC2	The student gets a view of what a destacker is.

Table 9: Performance Criteria for the Element AMPLS.U3.E1

3.5.2 AMPLS Unit 3 – Element 2: Feeder

Acronym: AMPLS.U3.E2

Element Title: Feeder

Element Note:

This Unit explains what a feeder is. Different types of it and how it works.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AEQM.U3.E2.PC1	The student gets the knowledge of what a feeder is and he/she must be able to know how it works.

Table 10: Performance Criteria for the Element AMPLS.U3.E2

3.5.3 AMPLS Unit 3 – Element 3: Line Monitoring

Acronym: AMPLS.U3.E3

Element Title: Line Monitoring

Element Note:

This Element is a second step to understand to analize data. The student is able to get data from the line and understand what the data tool is showing.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U3.E3.PC1	The student is able to read the data information that he tool is showing.

Table 11: Performance Criteria for the Element AMPLS.U3.E3

3.6 AMPLS UNIT 4: PRESS ADVANCED

Acronym: AMPLS.U4

Title: Press Advanced

Description:

After the second Unit, this Unit is specific to understand in deep the press line world. PLC, hydraulics and monitoring are worked in a higher level and in deep.

3.6.1 AMPLS Unit 4 – Element 1: Advanced Hydraulics

Acronym: AMPLS.U4.E1

Element Title: Advanced Hydraulics

Element Note:

After the global overview of hydraulics the student gets knowledge spicific of the hydraulic of the press

.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U4.E1.PC1	The student is able to understand in deep the hydraulic of a press

Table 12: Performance Criteria for the Element AMPLS.U4.E1

3.6.2 AMPLS Unit 4 – Element 2: Advanced Programming

Acronym: AMPLS.U4.E2

Element Title: Advanced Programming

Element Note:

This Element focuses on a press programme. How to built and understand it.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U4.E2.PC1	The student is able to built/change a press programme.
AMPLS.U4.E2.PC2	The student is able to understand a press programme.

Table 13: Performance Criteria for the Element AMPLS.U4.E2

3.6.3 AMPLS Unit 4 – Element 3: Advanced Monitoring

Acronym: AMPLS.U4.E3

Element Title: Advanced Monitoring

Element Note:

This Unit focuses on software which is specific to visualize many machine data. The student must learns the status of the press any time and if there is any issue what happens any time.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U4.E3.PC1	The student knows the status of the press any time using the software Scada.

Table 14: Performance Criteria for the Element AMPLS.U4.E3

3.7 AMPLS UNIT 5: SET-UP AND MAINTENANCE

Acronym: AMPLS.U5

Title: Set-Up and Maintenace

Description:

This Unit, the last one is the place that the student put into practice all knowledge he/she has acquired before during the formation.

3.7.1 AMPLS Unit 5 – Element 1: Set-Up

Acronym: AMPLS.U5.E1

Element Title: Set-Up

Element Note:

This Element is where the student use all knowledge has acquired before in all the Units, The student has all knowledge to start up a new press mixing hydraulic, electricity PLC, and automation.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U5.E1.PC1	The student is able to start a Press using all knowledge he/she has acquired before autonomously.

Table 15: Performance Criteria for the Element AMPLS.U5.E1

3.7.2 AMPLS Unit 5 – Element 2: Maintenance and Troubleshooting with Monitoring

Acronym: AMPLS.U5.E2

Element Title: Maintenance and Troubleshooting with Monitoring

Element Note:

The student, using the knowledge acquired is able to repair/or prevent and eventual machine stop. In the case that the machine is stopped the student is able to do running back.

Performance Criteria:

The student must be able to show evidence of competencies for the following performance criteria (PC):

Performance Criterion	Evidence Check: The student can demonstrate
AMPLS.U5.E2.PC1	The student is able to restart the machine in a eventual issue or prevent it.

Table 16: Performance Criteria for the Element AMPLS.U5.E2

ANNEXES

The annex provides overview of used skills set, coverage of Qualification Schemas and Legal background for Certification

ANNEX A ECQA DESCRIPTION

ECQA – EUROPEAN CERTIFICATION AND QUALIFICATION ASSOCIATION

ECQA standards are used to describe the skills sets delivered within the DRIVES project (www.project-drives.eu). ECQA is the pilot Certification body, which structure is mapped to DRIVES Reference and Recognition Framework providing the EU-wide overview of training courses and possible certifications, and micro-credentials. DRIVES Reference and Recognition Framework provides links to ESCO[7], EQF[8], ECTS[9] and ECVET[10]. See more in deliverable DRIVES-D4.1.1 Reference and Recognition Framework – Analysis.pdf (www.project-drives.eu).

Europe Wide Certification

The ECQA is the result of a number of EU supported initiatives in the last ten years where in the European Union Life Long Learning Programme different educational developments decided to follow a joint process for the certification of persons in the industry.

Through the ECQA it becomes possible that you attend courses for a specific profession in e.g. Spain and perform a Europe wide agreed test at the end of the course.

Access to a Vast Pool of Knowledge

ECQA currently supports 27 professions in Europe and with the continuous support until 2012 by the European Commission the pool is growing to 30 certified professions in Europe. ECQA offers certification for professions like IT Security Manager, Innovation Manager, EU project manager, E-security Manager, E-Business Manager, E-Strategy Manager, SW Architect, SW Project Manager, IT Consultant for COTS selection, Internal Financial Control Assessor (COSO/COBIT based), Interpersonal Skills, Scope Manager (Estimation Processes), Configuration Manager, Safety Manager, and so forth.

The ECQA guide can be downloaded at www.ecqa.org -> Guidelines.

Defined procedures are applied for:

- Self assessment and learning

- http://www.ecqa.org/fileadmin/documents/Self_Assessment/eucert-users-self-assessment-learning-guide-v5-doc.pdf
- Exam performance
- http://www.ecqa.org/fileadmin/documents/ECQA_Exam_Guide_Participant_v2.pdf

ECQA SKILLS DEFINITION MODEL

The ECQA skills definition model, used for Job Role definition, is described in section 2 of this document.

ECQA SKILL SET STRATEGY

Imagine that in the future Europeans will have a skill set like a card with a chip which stores your skill profile to fulfil specific professions, job roles, and tasks. It's working like an ID card. This future scenario requires -

- A standard way to describe a skill set for a profession, job, or specific task.
- A standard procedure to assess the skill and to calculate and display skill profiles.

Such a common set of skill sets in Europe is needed due to the free mobility of workers. European countries such as UK, The Netherlands, and France already have well established open universities which support APL (Accreditation of Prior Learning). In APL the skills of students are assessed, already gained skills are recognised, and only for the skill gaps a learning plan is established. The skill assessment bases on defined skill units and a skill profile displaying how much of the skill units are covered.

In a previous project CREDIT (Accreditation of Skills via the Internet) [1] in which some of the project partners were involved such an Internet based skills assessment system has been built. Therefore another possible scenario of the future is that representative educational bodies per country in Europe maintain skill profiles in databases which can be accessed via defined ID codes for people.

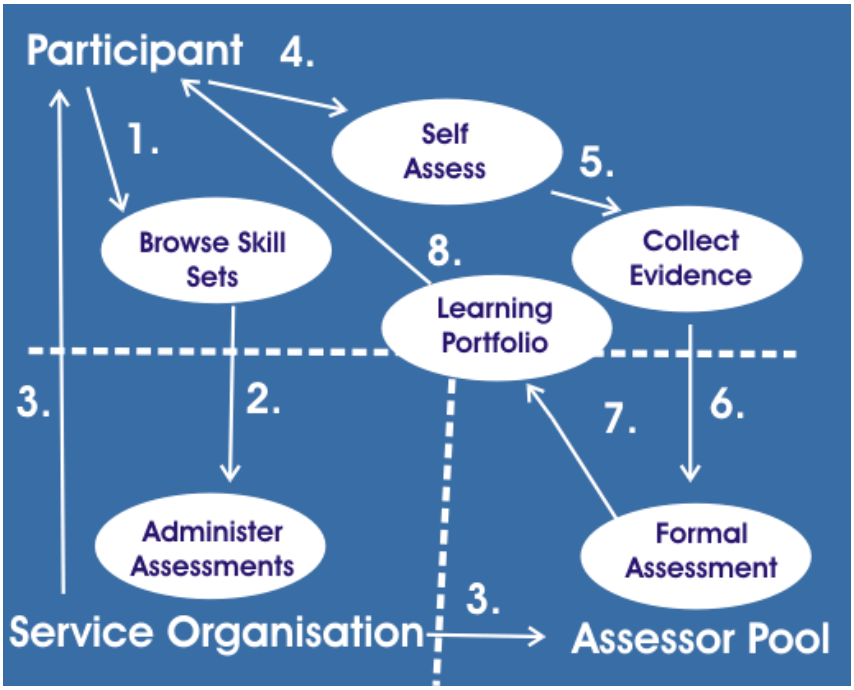
ECQA SKILLS ASSESSMENT MODEL

Step 1 – Browse a Skills Set: You select a set of skills or competencies, which are required by your profession or job using national standards or your company standards. You browse different skills cards and select a job role you would like to achieve.

Step 2 – Register for Self Assessment with a Service Unit : This can be a service unit inside your own company (e.g. a personnel development department) or a skills card and assessment provider outside

your company which offers skills assessment services. In case of the Safety Manager Project the registration will automatically assign a predefined service unit.

Step 3 – Receive an Account for Self-Assessment and Evidence Collection : With the registration you automatically received an account to login to the working space in which you can go through the steps of online self assessment and the collection of evidences to prove that you are capable of certain performance criteria.



Picture 1: Basic steps of the skills assessment model

Step 4 – Perform Self Assessment: You log into the system , browse through the skills required and self assess performance criteria, whole elements or whole units with a standard evaluation scale of non-applicable, not adequate, partially adequate, largely adequate, and fully adequate. A skills gaps profile can be generated and printed illustrating in which areas your self assessment shows improvement potentials.

Testing of Skills (Addition to Step 4) – The system provides a multiple-choice test for each performance criteria so that you can check your capabilities as realistically as possible.

Step 5 – Collect Evidences: Before you want to enter any formal assessment you need to prove your skills by evidences. Evidences can be any electronic files (sample documents, sample graphics, results of some analysis, etc.) or any references with details (e.g. a certificate received from a certain

institution). Evidences you can then link to specific performance criteria or whole elements of skills units.

Testing of Skills (Addition to Step 5) – In traditional learning schemes people have always needed to go to a learning institution (university, accreditation body, professional body, etc.) to take exams and they received a certificate if they pass. This traditional approach however is insufficient when it comes to measuring experience and (soft) skills learned on the job and fails to give recognition to skills gathered on the job. The APL (Accreditation of Prior Learning) approach, by contrast, collects so called evidences. Evidences can be certificates obtained in the traditional way, but also references from previous employers, materials from previous projects in which the person took ownership of results (e.g. a test plan) to prove their capability, as well as any kind of proof of competence gathered on the job. The assessors will then evaluate the evidences provided and not only rely on certificates and exams.

Step 6 – Receive Formal Assessment: Formal assessors are assigned by the service unit to the skills assessment. Once formal assessors log into the system they automatically see all assigned assessments. They select the corresponding one and can see the uploaded evidences. They then formally assess the evidences and assess the formal fulfilment of performance criteria, whole elements or whole units with a standard evaluation scale of non-applicable, not adequate, partially adequate, largely adequate, and fully adequate. In case of missing competencies they enter improvement recommendations, a well as learning options.

Step 7 – Receive Advise on Learning / Improvement Options: After the formal assessment the participants log into the system and can see the formal assessment results from the assessors, can print skills gaps profiles based on the assessor results, and can receive and print the improvement recommendations and learning options. If required, the generation of learning options can also be automated through the system (independent from assessor advises).

ECQA CERTIFICATE TYPES

In the standard test and examination procedures for levels of certificates are offered:

- Course Attendance Certificate
  - Received after course attendance
  - Modular per Element
- Course / Test Certificate
  - Test in a test system (European pool of test questions)
  - 67% satisfaction per element

- Summary Certificate
    - Overview of covered elements where the student passed the test, all elements shall be covered
    - Generation of certificate
- Professional Certificate
    - Uploading applied experiences for review by assessors
    - Rating by assessors
    - Observation of 2 years

The certificates show credited elements in comparison to all required.

ANNEX B ECQA COVERAGE OF QUALIFICATION SCHEMAS

MAPPING BASED ON NVQ QUALIFICATION LEVELS

Qualification / training levels: Five levels of qualification / training are defined by European legislation and this structure can be used for comparability of vocational qualifications from the different European countries.

- Level 1: semi-skilled assistant performing simple work
- Level 2: basic employee performing complex routines and standard procedures
- Level 3: skilled professional with responsibility for others and performing independent implementation of procedures
- Level 4: middle management & specialist performing tactical an strategic thinking
- Level 5: professional / university level

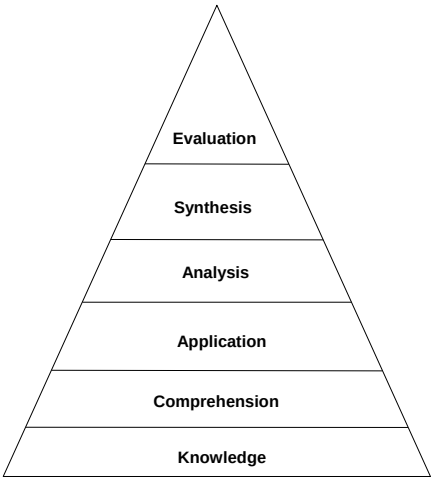
In most cases the same job role can be offered on different levels. e.g. IT Security Manager Basic Level (NVQ level 2), IT Security Manager Advanced level (NVQ Level 3), and IT Security Manager Expert Level (NVQ Levels 4 and 5).

MAPPING BASED ON EUROPEAN QUALIFICATION FRAMEWORK (EQF) LEARNING LEVELS

- Six level taxonomy:

  Level 0: I never heard of it

  1. Knowledge (I can define it):
  2. Comprehension (I can explain how it works)
  3. Application (I have limited experience using it in simple situations)
  4. Analysis (I have extensive experience using it in complex situations)
  5. Synthesis (I can adapt it to other uses)
  6. Evaluation (I am recognized as an expert by my peers)



Picture 3: Blooms Learning levels

Level	Knowledge	Example
Level 1	Basic general knowledge	
Level 2	Basic factual knowledge of a field of work or study	
Level 3	Knowledge of facts, principles, processes and general concepts, in a field of work or study	Six Sigma Yellow Belt
Level 4	Factual and theoretical knowledge in broad contexts within a field of work or study	
Level 5	Comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge	
Level 6	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	Six Sigma Green Belt
Level 7	• Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research • Critical awareness of knowledge issues in a field and at the interface between different fields	Six Sigma Black Belt

Level	Knowledge	Example
Level 8	Knowledge at the most advanced frontier of a field of work or study and at the interface between fields	Six Sigma Master Black Belt

Picture 4 : EQF Learning levels

MAPPING BASED ON ECTS AND ECVET SCHEMA

ECQA has established a procedure to map ECQA skills sets onto the ECTS (European Credit Transfer System) and the ECVET framework n the European Union.

A job role is assigned ECTS and ECVET points using a defined framework.

ECTS Mapping

Each element of the skills set is assigned hours of lecturing and exercises. These hours determine the ECTS points which are then agreed among a cluster on different universities in Europe.

Level	Knowledge	AQUA	ECTS	Safety Manager	ECTS
Level 1	Basic general knowledge	-		-	
Level 2	Basic factual knowledge of a field of work or study	-		-	
Level 3	Knowledge of facts, principles, processes and general concepts, in a field of work or study				
Level 4	Factual and theoretical knowledge in broad contexts within a field of work or study				
Level 5	Comprehensive, specialized, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge				
Level 6	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	AQUA - Automotive Quality Integrated Skills - presentations / theory	3	AQUA - Automotive Quality Integrated Skills - presentations / theory	3
Level 7	- Highly specialized knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research - Critical awareness of knowledge issues in a field and at the interface between different fields	AQUA - Automotive Quality Integrated Skills - with exercises to apply on nan example (e.g. ESCL)	4	AQUA - Automotive Quality Integrated Skills - with exercises to apply on nan example (e.g. ESCL)	4
Level 8	Knowledge at the most advanced frontier of a field of work or study and at the interface between fields	AQUA - Automotive Quality Integrated Skills - implementation in a research at PhD level / with link to a real project	5	AQUA - Automotive Quality Integrated Skills - implementation in a research at PhD level / with link to a real project	5

Picture 5 : Example Automotive Quality Engineer and Safety Manager

The 2 job roles illustrated in the picture above have been assigned to ECTS and are taught using the same skills set at industry and also universities.

ECVET Mapping

Also ECQA provides a framework to assign ECVET points onto elements of the skills set. The ECQA guidance recommends to offer the ECQA course (which is offered as a lecture at university) as a short course (2 weeks with exercises) in industry to retrain for a job role in industry. The recommended size is 30 ECVET points in total. The lecturing time and exercise per element determine how many ECVET points ae assigned to an element of the skills set.

Automotive Quality Engineer			
			ECVET L7&8
U1	4	U1.E1: Introduction	2
		U1.E2: Organisational Readiness	2
U2	32	U2.E1 Life Cycle	8
		U2.E2 Requirements	8
		U2.E3 Design	8
		U2.E4 Test and Integration	8
U3	12	U3.E1: Capability	2
		U3.E2: Hazard and Risk Management	8
		U3.E3 Assessment and Audit	2
U4	12	U4.E1: Measurement	6
		U4.E2: Reliability	6
		ECVET Points Total	60

Picture 6 : ECVET Mapping example - Automotive Quality Engineer

Functional Safety Manager / Engineer			
			ECVET L7&8
U1	2	U1.E1 International Standards	1
		U1.E2 Product Life Cycle	1
		U1.E3 Terminology	
U2	4	Safety management on organisational	1
		Safety Case Definition	1
		Overview of Required Engineering an	1
		Establish and Maintain Safety Plannin	1
U3	16	System Hazard Analysis and Safety Co	4
		Integrating Safety in System Design &	4
		Integrating Safety in Hardware Design	4
		Integrating Safety in Software Design	4
U4	4	Integration of Reliability in Design to I	2
		Safety in the Production,Operation an	2
U5	4	Legal aspects and Liabilities	2
		Regulatory & Qualification Requireme	2
		ECVET Points Total	30

Picture 7 : ECVET Mapping example – Functional Safety Manager / Engineer

ANNEX C ECQA LEGAL BACKGROUND FOR CERTIFICATION

ISO/IEC 17024 STANDARD FOR PERSONNEL CERTIFICATION PROGRAMMES

The ISO/IEC 17024 standard describes standard processes for the examination and certification of people. Some of the basic principles described include:

- Standard exam procedure
- Standard certification procedure
- Identification of persons receiving the certificate
- Independence of examiner and trainer
- Certification system that allows to log the exam to keep a record/proof that the examinee passed the exam
- Mapping of processes towards ISO 17024

ECQA AND ISO/IEC 17024 STANDARD

- ECQA defined standard exam processes
- ECQA defined standard certification processes
- ECQA developed an exam system that generates random exams and corrects exams.
- ECQA developed a certification database to identify persons and map them to exam results
- ECQA established a mapping onto the ISO 17024 norm and published that in form of a self declaration.

LIASION WITH NATIONAL UNIVERSITIES

ECQA established cooperation with national universities who teach job roles with ECTS. The same job roles are offered with ECVET on the market by training bodies.

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