

THE ECVET PROFILE OF THE EUROPEAN EXPERT IN WOMEN POWER CODE

<https://womenpowercode.eu/>



logos from partners

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Summary

1. OVERVIEW of the profile3

2. Principles of ECVET3

3. Aim of the project.....5

4. The WPC Expert Profile.....6

1. OVERVIEW OF THE PROFILE

The *Women Power Code* (WPC) ECVET profile outlined here aims to identify and select the knowledge, skills and competences related to the usage of ICT tools within learning environments for adult women. A particular focus is placed on the key 3D printing and IoT (*Internet of Things*) concepts and their practical applications.

We are introducing a reference framework for any adult woman interested in undertaking an education path in the field of IoT and 3D printing, aiming to connect individuals, groups, organisations and companies who are willing to help a higher number of women experience and learn the relevance of coding. This work will serve also as an orientation grid for teachers and all type of organisations in the public and private sector who need to make decisions about recruitment, career paths and staff training.

The WPC profile originates both from the results of the first research phase (i.e. the Desk Research and SWOT analysis conducted within IO1) and the different knowledge and expertise of the partners involved in the WPC project. This document describes the contents that need to be included in a WPC training course, the learning outcomes and the associated ECVET credit points.

The curriculum is structured in the following Learning Outcomes and Units:

1. *Module 1- 3D Printing*
 - a. *Unit 1 – Introducing 3D printing*
 - b. *Unit 2 – 3D Printers*
 - c. *Unit 3 – Practical Applications*
2. *Module 2 – Internet of Things*
 - a. *Unit 1 – Introducing the IoT world*
 - b. *Unit 2 – The Raspberry PI platform*
 - c. *Unit 3 – IoT Practical Applications*

2. PRINCIPLES OF ECVET

The European Credit system for Vocational Education and Training (ECVET) aims to give people greater control over their individual learning experiences and make it more attractive to move between different countries and different learning environments.

The system aims to facilitate the validation, recognition and accumulation of work-related skills and knowledge acquired during a stay in another country or in different situations. It should ensure that these experiences contribute to vocational qualifications.

ECVET aims for better compatibility between the different vocational education and training (VET) systems in place across Europe and their qualifications.

It aims to create a technical framework to describe qualifications in terms of units of learning outcomes, and it includes assessment, transfer, accumulation and recognition procedures.

Flexibility

In ECVET, learning outcomes are assessed and validated in order to transfer credits from one qualification system to another or from one learning pathway to another.

According to this approach, learners can accumulate the required learning outcomes for a given qualification over time, in different countries or in different situations.

The system also allows the possibility to develop common references for VET qualifications and is fully compatible with the European Credit Transfer and Accumulation System (ECTS).

ECVET is based on:

- *Learning outcomes* – statements of knowledge, skills and competence that can be achieved in a variety of learning contexts.
- *Units of learning outcomes* that are components of qualifications. Units can be assessed, validated and recognized.
- *ECVET points*, which provide additional information about units and qualifications in a numerical form.
- *Credit for assessed Units*. Credit can be transferred and accumulated to achieve a qualification.
- Mutual trust and partnership among participating organizations are expressed in *memorandum of understanding* and *learning agreements*.

Although ECVET is underpinned by the European legislation, participation is voluntary and national protocols are respected.

ECVET testing and implementation

ECVET is now in a phase of progressive implementation having created the necessary conditions and measures. The quality of ECVET testing is crucial. All stakeholders, such as awarding bodies, training and assessment providers, social partners and employers, are encouraged to engage in ECVET testing through projects and networks, in particular under the Lifelong Learning Program.

ECVET and validation of Non-Formal and Informal Learning

Countries around Europe are increasingly emphasizing the need to take account of the full range of an individual's knowledge, skills and competences not only those acquired at schools, universities or other formal education and training institutions. Recognizing all forms of learning is therefore a priority of EU action in education and training.

Learning that takes place in formal education and training systems is traditionally the most visible and recognized in the labour market and by society in general. In recent years, however, there has been a growing appreciation of the importance of learning in non-formal and informal settings. New approaches are needed to identify and assess and validate these 'invisible' learning experiences within the context of qualifications.

The new expert profile envisaged by the WPC project will be developed using the ECVET Framework Design.

Thus, the following steps will be taken:

- Design the curriculum of the qualification
- Identify the skills developed
- Identify the modules, the contents and award a credit value

What are the Learning Outcomes?

The Learning Outcomes are defined as statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence.

- Knowledge means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices related to a field of work or study. In the context of the European Qualifications Framework, knowledge is described as theoretical and/or factual.
- Skills mean the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework, skills are described as cognitive or practical skills.
- Competence means the proven ability to use knowledge, skills and personal, social and methodological abilities in work or study situations and in professional and/or personal development. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy.

Learning Outcomes are described in units. A unit of learning outcomes (also called "unit" or "module") is one of the components for a professional profile, consisting of a coherent set of knowledge, skills and competence that can be assessed and validated. This implies that the units of learning outcomes shall be structured comprehensively and logically, and that they can be examined. Units of learning outcomes can be specific to a single professional profile or common to several.

Following the definition gave by the EQF, a Learning Outcome is a statement of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence.

Trying to be more concise, a LEARNING OUTCOME expresses the purpose of the training, so it must be the final objective of the learning process described as an achievement.

3.AIM OF THE PROJECT

The project objective is to deliver a completely innovative training system based on the current most effective LME (*Learning Motivation Environment*) and interactive tools, helping adult women to acquire basic knowledge of ICT and STEM while promoting an active and conscious usage of IoT solutions. The project partners are committed to identify a set of skills and competences accountable at EU level in compliance with the EU Quality Framework and European Credit VET system (ECVET).

The aim is to develop a new curriculum / expert profile dedicated to women involved in ICT professional fields, following a continuous learning process. To achieve this goal, the project will develop the following actions:

- Define the new curriculum by sharing the experiences of UK, Romania, Belgium, Italy, Netherlands, Bulgaria and Slovenia, mutually enhancing each other;
- Introduce training contents according to end-users needs and updated with the most innovative technological tools available;
- Define a training model recognized at EU level by answering to ECVET principles and work-based learning practices;
- Facilitate the involvement of adult women in the digital job market.

The project rationale is based on the Digital Agenda, one of the 7 pillars of the Europe 2020 Strategy, proposing to better exploit the potential of ICTs in order to foster innovation, economic growth and progress across Europe.

Studies on the presence of women in STEM (Science, Technology, Engineering and Math) indicate that a lot of work has to be done before this will be considered a field where gender equality will no longer be an issue.

Digitally skilled and growing numbers of women in the ITC industry will mean economic growth and a more inclusive society. A policy change is needed particularly because of an alarming drop in ICT female graduates (indeed, today only 29 out of every 1000 female graduate have a computing or related degree, and only 4 go on to work in ICT-related activities). One way to reverse this trend is to encourage adult women, to take up an STEM/ICT-related careers.

Basic coding skills is needed for many jobs. More than 90% of professional occupations nowadays require digital competences, including programming. There is also a talent shortage as the education system is slow to react to new demands. In Europe we will have up to 825,000 ICT job vacancies by 2020.

In the world of today, learning the digital language and becoming digitally savvy is a must in order to get a job. In the future, it has been estimated that 90% of jobs will demand digital skills, and the Digital Agenda for Europe estimates that by 2020 there will be a skills deficit that equates almost a million unfilled jobs. Despite high unemployment across Europe, the huge e-skills gap is a barrier to accessing existing roles in the sector. In order to boost competitiveness, productivity and employability of the workforce, we need to bridge this e-skills gap by updating the skills of the existing talent pool.

Women aged between 40 and 60 are the selected target group for the project, particularly those who are willing to improve their daily life, to change their job or to find new opportunities.

The project will focus on five important objectives and pillars:

1. Creation of key *Internet of Things* (IoT) concepts for using them in programming of IoT by using code language for redesigning the knowledge, skills and competences of the new curricula and new expert profile acquired by minimum 140 adult women until 2020;
2. Elaboration of a new curricula and new expert profile in the IT field for adult women, based on the gamification;
3. Elaboration of training manual with 6 modules for a new specialization in the IT field for adult women;
4. Developing attitudes, mental models and engagement of minimum 140 adult women by creating the new and innovative WOMEN POWER CODE VIDEOGAME that will be tested and disseminated in 2020 for increasing work-based active learning;
5. Setting up until mid of 2020 of a Social Learning Community (SLC) dedicated to adult women, aiming to make the digital world more attractive for adult women as well as cooperation building for creativity and innovation development among stakeholders (VET providers, IT companies, Universities, Women Associations) from IT field.

4.THE WPC EXPERT PROFILE

The Research activity conducted by the project partners for the *Intellectual Output 1* has delivered the following 4 main results:

1. The constant development of the Internet of Things (IoT) allows for new entrepreneurship possibilities. The impact on our society has already started to show significant changes both in personal lives and work, implying the acquisition of new knowledge and skills. Ubiquitous content and IoT are an integral part of the present society and will form the base for tomorrow's innovations. Early adopters will come up with money making ideas, identifying modern strategies to make their current business more competitive.
2. 3D Printing and IoT have been identified as motivational and effective ways of introducing women and children to coding. Practical applications relating to daily life and combining the online with the offline world are considered a trigger for women to embrace coding without increasing screen time but by taking their "craft" outside the screen and into their lives.
3. Women would happily embrace new technologies which can improve their daily lives and/or professional careers. Anyway, they need community support to some degree. The early engagement of the target group with the project is a key element, and sustainability should be a core ingredient while designing the training content and tools.
4. The Raspberry Pi is acknowledged as the current most widely used microcomputer for 3D printing and IoT applications. Apart from being cheap and highly supported by strong communities of developers, it comes with a wealth of resource tools which currently has no equals. The challenge here is to generate awareness and disseminate knowledge about the existing wealth of resources, tools and support: enthusiasm will do the rest and stimulate innovative ideas.

These four results have been translated into Learning Outcomes for the purposes of the ECVET implementation of this profile. This template includes:

- Name of the Learning Outcomes
- EQF level
- Description of the L.Os
- Units of the LO
- Breakdown in terms of knowledge, skills and competences for each unit of the LO.

NAME OF THE MODULE			TAKING THE CRAFT OUT OF THE SCREEN: 3D PRINTING
DEFINITION OF THE LEARNING OUTCOME		<i>The European Expert in Women Power Code (WPC) knows the principles of the 3D printing technology and the features of the main printer models available, including the possible applications in both business and daily life and the related professional profiles.</i>	
EQF LEVEL		4	
ECVET CREDITS		NO. 3 (75 hours)	
WPC TRAINING COURSE HOURS		ON LINE COURSE	SELF LEARNING
		25 hours	50 hours
UNIT 1		<i>The European Expert in WPC is able to understand and describe the basics of 3D printing technology and its implications in both daily life and female entrepreneurship.</i>	
KNOWLEDGE		SKILLS	COMPETENCES
<p><i>THE EUROPEAN EXPERT IN WPC has a comprehensive knowledge of the 3D printing technology and the process behind it.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC knows the available tools and methods for 3D printing.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC understands the level and areas of application of 3D printing technology for both leisure and business.</i></p>		<p><i>THE EUROPEAN EXPERT IN WPC is able to classify and describe different tools to adopt 3D printing technologies.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC investigates and deduce causes/setbacks which may hinder the application of 3D printing</i></p> <p><i>THE EUROPEAN EXPERT IN WPC classifies the level and sectors of action to address a specific problem/issue/need related to the application of 3D printing into relevant business or personal contexts.</i></p>	<p><i>THE EUROPEAN EXPERT IN WPC demonstrates, recognizes and expresses how 3D printing may be an effective and motivational way to introduce women to coding.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC identifies and explains the benefits of 3D printing techniques aimed at female employability.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC takes responsibility in sorting out and choosing key factors for the identification of opportunities linked to 3D printing key educational outcomes.</i></p>
UNIT 2		<i>THE EUROPEAN EXPERT IN WPC is able to define and recognize the main models of 3D printers available and their characteristics, analysing their application to both daily life and female entrepreneurship.</i>	
KNOWLEDGE		SKILLS	COMPETENCES
<p><i>THE EUROPEAN EXPERT IN WPC knows the main types and models of 3D printers available.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC is fully aware of the differences between 3D printers which work with laser beams and 3D printers which work with plastic filaments.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC describes the pros and cons of both laser beams and plastic filaments cutting techniques.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC have a good knowledge of the available software for 3D printing and of the STL file format, i.e. the export standard format.</i></p>		<p><i>THE EUROPEAN EXPERT IN WPC illustrates the main types and models of 3D printers available.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC is able to explain how laser-beams and plastic-filaments 3D printers work, highlighting their differences with suitable examples.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC analyses the pros and cons of both laser beams and plastic filaments cutting techniques, putting them in relation with her/his needs.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC is able to classify and select the most suitable 3D printing software available, running ad-hoc tests.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC makes proposals on the adoption of a specific 3D printer and estimates the potential impact outcomes of the idea proposed.</i></p>	<p><i>THE EUROPEAN EXPERT IN WPC autonomously select the 3D printer model which best suits her/his needs.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC singles out key factors for the identification of opportunities related to 3D printers, by taking decision whether considering a certain factor as the key one.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC instructs and advises on the recognition and selection process of 3D printers, by splitting down potential effects and benefits on the basis of her/his needs.</i></p> <p><i>THE EUROPEAN EXPERT IN WPC advises on a specific 3D printer using examples, case studies and best practices.</i></p>
UNIT 3		<i>THE EUROPEAN EXPERT IN WPC knows and exploits the practical applications of 3D printing, with relation to both daily life and female entrepreneurship.</i>	

KNOWLEDGE	SKILLS	COMPETENCES
<p>THE EUROPEAN EXPERT IN WPC is fully aware of the two main options related to the practical application of 3D printing:</p> <ul style="list-style-type: none">- buy your own 3D printer- design your model and outsource the printing. <p>THE EUROPEAN EXPERT IN WPC has a good knowledge of the best free software to get started with 3D printing.</p> <p>THE EUROPEAN EXPERT IN WPC knows the difference between designing and reproducing objects with 3D printing.</p> <p>THE EUROPEAN EXPERT IN WPC has a good knowledge of AGISOFT, one of the simplest and most effective software to build 3D models from photos.</p>	<p>THE EUROPEAN EXPERT IN WPC is able to analyze pros and cons of buying her/his own 3D printer, making assumptions based on the specific needs.</p> <p>THE EUROPEAN EXPERT IN WPC is able to analyze pros and cons of designing a mode and outsourcing the printing, making assumptions based on the specific needs.</p> <p>THE EUROPEAN EXPERT IN WPC classifies and describes the best free software to get started with 3D printing.</p> <p>THE EUROPEAN EXPERT IN WPC is able to illustrate by examples and describe the implications of designing and reproducing objects with 3D printing.</p> <p>THE EUROPEAN EXPERT IN WPC can install and use the AGISOFT software to build her/his first 3D printing projects.</p>	<p>THE EUROPEAN EXPERT IN WPC makes autonomous decision on which practical application of 3D printing should be adopted, drafting plans accordingly.</p> <p>THE EUROPEAN EXPERT IN WPC advises on the practical applications of 3D printing, with relation to both business and leisure.</p> <p>THE EUROPEAN EXPERT IN WPC instructs on the difference between designing and reproducing objects with 3D printing, making choices based on specific requirements.</p>

NAME OF THE MODULE		LINKING THE ONLINE AND THE OFFLINE WORLDS: THE INTERNET OF THINGS (IoT)	
DEFINITION OF THE LEARNING OUTCOME	The European Expert in Women Power Code (WPC) knows the main concepts related to the Internet of Things (IoT) and understands how it can bring a change in people’s daily lives, capitalizing on its practical applications.		
EQF LEVEL	4		
ECVET CREDITS	NO. 3 (75 hours)		
WPC TRAINING COURSE HOURS	ON LINE COURSE		SELF LEARNING
	25 hours		50 hours
UNIT 1	The European Expert in WPC is able to illustrate the definition of IoT, highlighting present/future applications in both daily life and female entrepreneurship.		
KNOWLEDGE	SKILLS	COMPETENCES	
THE EUROPEAN EXPERT IN WPC knows the definition of Internet of Things and its key concepts. THE EUROPEAN EXPERT IN WPC understands the potential benefits and the implications of applying the IoT into her/his daily life. THE EUROPEAN EXPERT IN WPC has a good knowledge of the relevant workplaces and professional profiles related to IoT.	THE EUROPEAN EXPERT IN WPC is able to illustrate by examples the definition of the IoT, and how it links the offline with the online world.	THE EUROPEAN EXPERT IN WPC uses the IoT key concepts to formulate potential models of application for business or daily life.	
	THE EUROPEAN EXPERT IN WPC can describe in details how IoT can create value into people’s daily lives, therefore providing reasons why it should be implemented.	THE EUROPEAN EXPERT IN WPC instructs and advises about a safe and secure implementation of IoT tools and solutions.	
	THE EUROPEAN EXPERT IN WPC identifies challenges and opportunities related to the application of IoT into different business fields.	THE EUROPEAN EXPERT IN WPC autonomously applies the IoT approach/perspective to identify a new potential solution for a practical/business problem.	
UNIT 2	THE EUROPEAN EXPERT IN WPC knows the main features and characteristics of the Raspberri PI, i.e. the easiest and most diffused microcomputer to get started with IoT practices.		
KNOWLEDGE	SKILLS	COMPETENCES	
THE EUROPEAN EXPERT IN WPC has a good knowledge of the Raspberri PI single-board computer, and understands why it has become one of the most widely diffused device in the field. THE EUROPEAN EXPERT IN WPC defines why the Raspberri PI should be used, classifying potential benefits and setbacks. THE EUROPEAN EXPERT IN WPC recognizes the available hardware additions and software to interact with the Raspberri PI device. THE EUROPEAN EXPERT IN WPC lists practical examples of the Raspberri PI use in both business and daily lives.	THE EUROPEAN EXPERT IN WPC is able to outline with details the main features and characteristics of the Raspberri PI device.	THE EUROPEAN EXPERT IN WPC instructs about the Raspberri PI and its main features and characteristics	
	THE EUROPEAN EXPERT IN WPC analyses possible strengths and weaknesses of the Raspberri PI.	THE EUROPEAN EXPERT IN WPC advises on the Raspberri PI using examples, case studies and best practices.	
	THE EUROPEAN EXPERT IN WPC develop a plan for the adoption of the Raspberri PI into her/his own business/daily life.	THE EUROPEAN EXPERT IN WPC autonomously builds a plan of activities which can be carried out with the adoption of the Raspberri PI.	
	THE EUROPEAN EXPERT IN WPC selects the most suitable hardware additions and software to interact with the Raspberri PI, measuring them against her/his needs.	THE EUROPEAN EXPERT IN WPC autonomously sets to work the Raspberri PI device.	
	THE EUROPEAN EXPERT IN WPC investigates and identifies the scopes for application of the Raspberri PI in her/his business/daily life.		
UNIT 3	THE EUROPEAN EXPERT IN WPC knows and exploits the practical applications of the IoT		
KNOWLEDGE	SKILLS	COMPETENCES	
THE EUROPEAN EXPERT IN WPC has a good knowledge of	THE EUROPEAN EXPERT IN WPC understands of IoT value chain structure (device, data	THE EUROPEAN EXPERT IN WPC instructs about the IoT value chain structure application	

IoT chain structure, application areas and technologies involved as well as about IoT sensors and technological challenges.

THE EUROPEAN EXPERT IN WPC recognizes the best IoT devices.

THE EUROPEAN EXPERT IN WPC lists practical examples designed for Raspberry Pi using code.

THE EUROPEAN EXPERT IN WPC lists practical applications of the IoT.

cloud), application areas and technologies involved.

THE EUROPEAN EXPERT IN WPC understands IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power and sensing.

THE EUROPEAN EXPERT IN WPC analyses the market forecast for IoT devices with a focus on sensors and relevant hardware.

THE EUROPEAN EXPERT IN WPC explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi.

THE EUROPEAN EXPERT IN WPC prepares practical applications of the IoT.

areas and technologies involved.

THE EUROPEAN EXPERT IN WPC instructs about the IoT sensors and technological challenges.

THE EUROPEAN EXPERT IN WPC advises on the IoT devices.

THE EUROPEAN EXPERT IN WPC autonomously sets to work projects designed for Raspberry Pi.

THE EUROPEAN EXPERT IN WPC autonomously sets to work practical applications of the IoT.