



OA2

SKILLS DEVELOPMENT FRAMEWORK

EXECUTIVE SUMMARY

2020/07/16

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1. Collaboration Management Framework

This Collaboration management framework has been developed to facilitate and enhance the cooperation between corporates and start-ups/scale-ups, especially with the advent of Industry 4.0. This is an important subject to improve open innovation and, thus, to promote growth for both kinds of companies. In order to identify the most suitable skills for this collaboration, several case studies were compiled by the members of the consortium, learning from failures of collaborations between established companies and start-ups/scale-ups. These case studies provide a great opportunity to select the collaboration skills missing (or those that are present) for the start-ups/scale-ups and established companies. The important question here is: what collaboration skills do the start-ups/scale-ups and corporates miss for them to fail the collaboration? But also: what collaboration skills might already be present in the case studies? In order to identify such skills, the consortium worked according to the European Innovation Management Standard CEN/TS 16555 Part 5: Collaboration management used, and to Digicomp 2.0 and ENTRECOMP frameworks.

These case studies revealed some *types* (CEN/TS 16555 Part 5: Collaboration management) and *modes* of collaboration. The *type* of collaboration that occurred the most in the case studies is Bilateral collaboration. The modes of collaboration that were present the most in the case studies are: Gaining “exposure” to start-ups, “Trend-spotting”, Acceleration programs and Co-creation. The most important objective of this report was to derive the skills needed for collaboration between start-ups/scale-ups and established companies. That was done by using the Digicomp 2.0 and ENTRECOMP competence frameworks. Hence, the 15 skills that were identified as needed for the collaboration between start-ups/scale-ups and corporates, based on the case studies and the competence frameworks are:

<ul style="list-style-type: none"> ● Expert data analysis ● Advanced social selling ● Mobile expertise ● Multi-platform UX design ● Network and information security ● Creative thinking ● Finding opportunities to help others ● Recognising opportunities to create value 	<ul style="list-style-type: none"> ● Quickly take advantage of opportunities ● Involve others in value-creating activities ● Contribute to simple value-creating activities ● Design working methods and incentives that enable people to work together ● Recognising what is learnt from taking part in value creating activities ● Reflecting on own experience based on own value-creating activities and learn from it
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	<ul style="list-style-type: none"> ● Learn from monitoring and evaluation processes and establish learning processes in own organisation
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These skills will be used afterwards to design the skills cards, which the start-ups/scale-ups and established companies will be able to use to have a full set of skills needed to collaborate successfully.

2. Skills Cards

The Upskilling Lab 4.0 skills cards provide description in the form of individual cards with the necessary level of expertise, qualifications, skills, knowledge, responsibilities within the collaboration management and open innovation process.

Skills cards background: the skills cards are developed with the use of the conclusion provided in the elaborated Collaboration Management Framework. Within the Framework, as a result of explored case studies, important competences were identified.

Based on this and the studied cases, the Collaboration Management Framework identified the 15 important skills areas.

Structure of the Skills Cards

The 15 identified areas are translated into eight skills cards as follows:

- Data analysis (incorporating skills area 1)
- Value-based selling/value-creating activities (incorporating skills 2, 8, 10, 11, 13 and 14)
- Mobile expertise/Multi-platform UX design (incorporating skills 3 and 4)
- Network and information security (incorporating skills area 5)
- Creative thinking (incorporating skills area 6)
- Monitoring and evaluation processes (incorporating skills area 15)
- Collaboration (incorporating skills areas 7 and 9)
- Netiquette (necessary for all 15 identified skills areas).

Recognizing the fact that a variety of skills are necessary for collaboration management for open innovation in Industry 4.0, the skills cards, thus, cover the different aspects of the project: technical, innovative and managerial. They include examples for topic specific skills (such as network and information security, mobile expertise/multi-platform UX design and value-based selling) and horizontal/transversal skills (data analysis, creative thinking, collaboration, monitoring and evaluation, netiquette).

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The skills cards cover for each of these skills areas the following skills aspects:

- 1) Technical skills – technology + legislation (IPR) – hard skills;
 - 2) Social-emotional skills
 - 3) Cultural responsive skills
 - 4) Creative skills
- } soft skills

These are elaborated for the following expert levels:

1. Beginners'/basic level, trainee;

2. Fair/intermediate;

3. Proficient;

4. Expert.

The fact that start-ups quite often will count on external expertise, advisors, mentors and consultants till they build their teams at the proficient and expert level for some of the fields, for established companies this expertise is often present inside the company and needs to be maintained and expanded through continuous learning. Thus, the following methods for continuous learning are identified for each of the levels.

Methods of continuous learning:

- 1) **Basic;**
- 2) **Intermediate;**
- 3) **Proficient;**
- 4) **Expert.**

Use of the Skill Cards

The skills cards are designed in a way that could be user-friendly for different sets of stakeholders.

1. **Policy makers** – as a quick reference to identify specific soft skills gaps and foster development of continuous learning programmes and policies;
2. **Teachers, trainers** – as a checklist when elaborating specific content, exercises and testing to ensure the progress of their students;
3. **Start-ups** – as a checklist that will guide them through necessary skills and competences needed in building their star teams;
4. **HR specialists in companies** – a quick reference list when recruiting new staff and a helpful checklist to facilitate internal gaps to address these with development of their specific internal corporate tailor-made trainings and team building exercises.

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- Innovation specialists/managers** – as a fast track for detection of gaps and update in skills needed for successful open innovation projects.

The skills cards development takes into account and is based on standard CEN/TS 16555.

3. Skills Development Framework

Learning Model Cycle

From an operational point of view, a learning-teaching framework is designed to guide the work of trainees and instructors. So it has been proposed a circular framework that is deployed in five steps like shown in Figure 1.

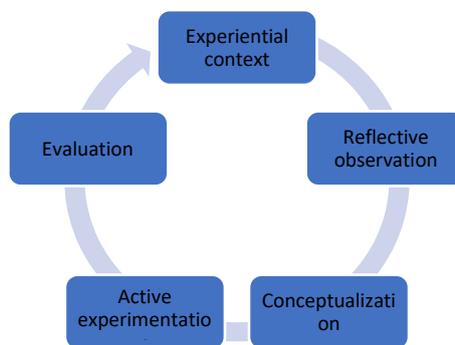
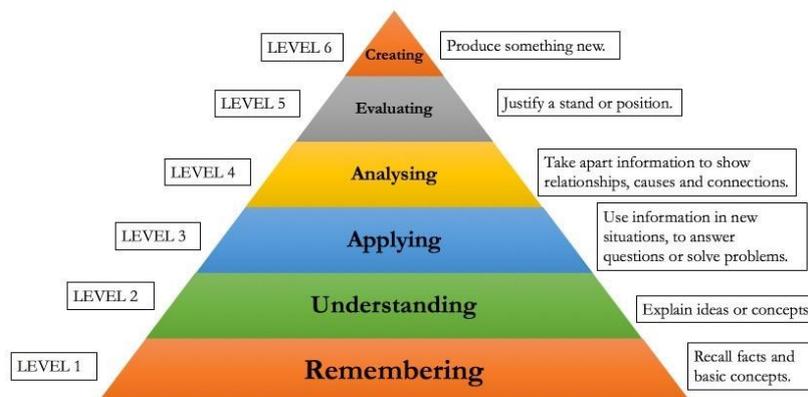


Figure 1 – Learning model cycle

Bloom's taxonomy

As the aim of the Project is to develop some skills, the consortium has built on the taxonomy proposed by Benjamin Bloom. In a few words, Bloom's taxonomy is a framework for educational achievement based in hierarchical levels, and often depicted in form of a pyramid.



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Figure 2 - Bloom Taxonomy Pyramid

The foundation of the model implies that trainees move up through each level of the pyramid in Bloom’s taxonomy, starting from very basic learning, to acquiring deeper knowledge on a subject, with each level becoming crucial to the development of the next.

Bloom’s taxonomy is further divided into three distinct learning objectives, or domains of educational activities: cognitive, affective, and psychomotor. The first two are directly connected with the philosophy of the Skill Cards previously described.

Following this taxonomy, the consortium has matched Upskilling Lab 4.0 levels and those of Bloom’s taxonomy domains as shown in the next table:

		Bloom’s Taxonomy	
		Cognitive domain	Affective domain
U p s k i l l i n g	Beginners/basic	Remember	Receiving
		Understand	Responding
	Fair/intermediate	Apply	Valuing
	Proficient	Analyse	Organization
	Expert	Evaluate	Characterization
		Create	

Table 1 – Upskilling and Bloom’s Taxonomy correspondence

And, finally for each of the 8 macroskills/competences developed by the Skill Cards, several activities and ways of assessment are proposed to achieve each of the levels of domain that this Project aims to cope with. These proposals are described in the next tables.



Beginner/basic						
Activities				Assessment		
Technology + Legislation (IPR)	A1 - Flashcards	A8 - Listen as audience to a presentation	A3 - List	E14 - One-minute paper	E8 - Feedback forms	E1 - Clicker questions
	A2 - Highlight key words		A4 - Memory activities			E15 - Qualitative interviews
Social-emotional	A5 - Reading materials	A9 - Read articles/papers/textbooks	A9 - Read articles/papers/textbooks	E18 - Concept map	E16 - Test activities (recall and verbalize reactions)	E3 - Label
	A6 Watching presentations and videos		A11 - Concept map			E20 - Essay
	A10 - Case studies	A12 - Demonstrations	A13 - Diagrams	E23 - Matrix activity	E26 - Short answers	E5 - Multiple choice
	A15- Gamification		A14 - Flowcharts			E24 - Presentation
	A16 - Group discussions	A28 - Written assignments (essays, reports)	A21 - Summarize	E25 - Provide examples	E27 - Answer questions	E7 - True and false questions
	A17 - Light board		A29 - Questionnaires			E29 - Critical questioning
	A18 - Mind map			E30 - Feedback and peer evaluation		E10 - Knowledge survey
	A19 - Matrix activity					E11 - List
	A22 - Think-pair-share					E12 - Match
	A23 - Active participating in class activities					E13 - Memory tests
	A26 - Problem solving activities					E17 - Write summary on key points of presentation
	A27 - Role-play					E19 - Create a summary
			A7 - Attend focus groups			E21 - Diagrams
			A24 - Brainstorm ideas			E28 - Ability to follow procedures
			A25 - Present in front of audience			E31 - Questionnaires
						E32 - Willingness to participate

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<p>Cultural responsive</p>		<p>A7 - Attend focus groups A11 - Concept map A20 - Play/sketches A24 - Brainstorm ideas</p>	<p>A3 – List A8 - Listen as audience to a presentation A9 - Read articles/papers/textbooks</p>			<p>E12 - Match E16 - Test activities (recall and verbalize reactions) E17 - Write summary on key points of presentation E19 - Create a summary E32 - Willingness to participate</p>
<p>Creative skills</p>		<p>A25 - Present in front of audience</p>	<p>A12 - Demonstrations A13 - Diagrams</p>			<p>E8 - Feedback forms E21 – Diagrams E22 - Infographics E26 - Short answers E27 – Answer questions E32 - Willingness to participate</p>

Table 2 – Upskilling Activities & Assessments for Beginner/Basic

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Fair/intermediate					
		Activities	Assessment		
Technology + legislation (IPR)		A30 - Calculate A32 - Demonstrations A36 - Lab experiments A37 - Map A38 - Prezi		E35 - Lab reports E36 - Problem-solving tasks E37 - Tests E39 - Needfulness and carefulness (with minimal errors) of submitted work E41 - Proposals of new plans E42 - Rating scale E43 - Reflection paper E44 - Report on activities E45 - Ungraded paper	
Social-emotional	A31 - Creating examples A33 - Flipped classrooms A39 - Debates A40 - Opinionated writing piece A41 - Reflection paper A42 - Self-report	A34 - Galleries walk A35 - Group work	E33 - Discussion board post E34 - E-portfolio E38 - Attendance E40 - Meet deadlines	E43 - Reflection paper E45 - Ungraded paper	
Cultural responsive		A34 - Galleries walk A38 - Prezi		E36 - Problem-solving tasks E39 - Needfulness and carefulness (with minimal errors) of submitted work E43 - Reflection paper E44 - Report on activities	
Creative skills		A32 - Demonstrations A34 - Galleries walk A35 - Group work A36 - Lab experiments A37 - Map A38 - Prezi		E35 - Lab reports E36 - Problem-solving tasks E39 - Needfulness and carefulness (with minimal errors) of submitted work E41 - Proposals of new plans	

Table 3 – Upskilling Activities & Assessments for Fair/Intermediate

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Proficient				
Activities			Assessment	
Technology + legislation (IPR)	A44 - Discussions A48 - Think-pair-share	A43 - Compare and contrast (with charts, tables, Venn diagram) A45 - Graph A46 - Group investigation A49 - Review paper A50 - Analyse and contrast (with charts, tables)	E47 - Case studies E49 - Critique hypothesis, procedures E50 - Muddiest point E51 - Research paper E52 - Review paper E55 - Focus groups	E46 - Analysis paper E48 - Evaluation criteria E54 - Prioritize time to meet goals (hand work in on time) E56 - Ability to solve new problems
Social-emotional	A51 - Concept map (report formal or informal experiences and identify skills)	A46 - Group investigation A48 - Think-pair-share A49 - Review paper		E46 - Analysis paper E53 - Develop realistic aspirations
Cultural responsive		A45 - Graph A46 - Group investigation A49 - Review paper		E53 - Develop realistic aspirations
Creative skills		A43 - Compare and contrast (with charts, tables, Venn diagram) A45 - Graph		E53 - Develop realistic aspirations E56 - Ability to solve new problems

Table 4 – Upskilling Activities & Assessments for Proficient

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		Expert	
		Activities	Assessment
Technology + legislation (IPR)		A53 - Pros and cons list A62 - Research projects	E61 – Report E65 - Develop criteria to evaluate product or solution E66 - Grant proposal
Social-emotional	A39 - Debates A52 – Journal A54 - Critical reflection A55 - Group projects	A53 - Pros and cons list A56 - Self-report goals A24 - Brainstorm ideas A60 - Performances	E57 - Argumentative or persuasive essay E58 - Debates E59 – Discussions E62 - Criteria for group projects E63 - Self-evaluation
Cultural responsive	A58 - Decision-making tasks A59 - Develop and describe new solutions or plans A61 - Presentations	A53 - Pros and cons list A60 - Performances A62 - Research projects	E60 - Provide alternative solutions E64 - SMART goal E67 - Outline alternative solutions E68 - Research proposal E62 - Criteria for group projects E63- Self-evaluation E65 - Develop criteria to evaluate product or solution
Creative skills		A56 - Self-report goals A24 - Brainstorm ideas A60 - Performances A62 - Research projects	E61 – Report E62 - Criteria for group projects E63- Self-evaluation

Table 5 – Upskilling Activities & Assessments for Expert

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Partners



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