IO2

Skills development framework

EXECUTIVE SUMMARY

2020/07/16

# **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:

|  |  |
| --- | --- |
| * 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 | * 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 * Learn from monitoring and evaluation processes and establish learning processes in own organisation |

These skills were 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.

# **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).

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 soft skills

4) Creative 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.
5. **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.

# 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.

Experiential context

Reflective observation

Conceptualization

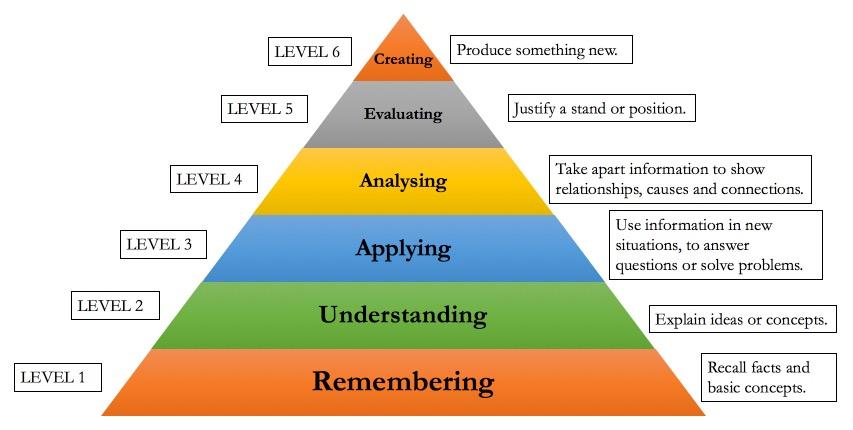
Active experimentation

Evaluation

*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.



*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** |
| **Upskilling** | **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  A2 - Highlight key words  A5 - Reading materials  A6 Watching presentations and videos  A10 - Case studies  A15– Gamification  A16 - Group discussions  A17 - Light board  A18 - Mind map  A19 - Matrix activity  A22 - Think-pair-share  A23 - Active participating in class activities  A26 - Problem solving activities  A27 - Role-play | A8 - Listen as audience to a presentation  A9 - Read articles/papers/ textbooks  A12 – Demonstrations  A28 - Written assignments (essays, reports)  A29 - Questionnaires | A3 - List  A4 - Memory activities  A9 - Read articles/papers/textbooks  A11 - Concept map  A13 - Diagrams  A14 - Flowcharts  A21 - Summarize | E14 - One-minute paper  E15 - Qualitative interviews  E18 - Concept map  E20 – Essay  E23 - Matrix activity  E24 - Presentation  E25 - Provide examples  E29 - Critical questioning  E30 - Feedback and peer evaluation | E8 - Feedback forms  E16 - Test activities (recall and verbalize reactions)  E26 - Short answers  E27 - Answer questions | E1 - Clicker questions  E2 - Fill-in-the blanks  E3 – Label  E4 – Match  E5 - Multiple choice  E6 – Quizzes  E7 - True and false questions  E9 - Fill-in-the-blanks  E10 - Knowledge survey  E11 - List  E12 - Match  E13 - Memory tests  E17 - Write summary on key points of presentation  E19 - Create a summary  E21 – Diagrams  E28 - Ability to follow procedures  E31 - Questionnaires |
| **Social-emotional** | A7 - Attend focus groups  A24 - Brainstorm ideas  A25 - Present in front of audience | E32 - Willingness to participate |
| **Cultural responsive** | A7 - Attend focus groups  A11 - Concept map  A20 - Play/sketches  A24 - Brainstorm ideas  A25 - Present in front of audience | A3 – List  A8 - Listen as audience to a presentation  A9 - Read articles/papers/textbooks |  | 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 |
| **Creative skills** | A12 - Demonstrations  A13 - Diagrams | E8 - Feedback forms  E21 – Diagrams  E22 - Infographics  E26 - Short answers  E27 – Answer questions  E32 - Willingness to participate |

*Table 2 – Upskilling Activities & Assessments for Beginner/Basic*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Fair/intermediate** | | | |
|  | **Activities** | | **Assessment** | |
| **Technology + legislation (IPR)** | A31 - Creating examples  A33 - Flipped classrooms  A39 - Debates  A40 - Opinionated writing piece  A41 - Reflection paper  A42 - Self-report | A30 - Calculate  A32 - Demonstrations  A36 - Lab experiments  A37 - Map  A38 - Prezi | E33 - Discussion board post  E34 - E-portfolio  E38 - Attendance  E40 - Meet deadlines | 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** | A34 - Galleries walk  A35 - Group work | 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*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Proficient** | | | |
|  | **Activities** | | **Assessment** | |
| **Technology + legislation (IPR)** | A44 - Discussions  A48 - Think-pair-share  A51 - Concept map (report formal or informal experiences and identify skills) | 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** | 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*

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

# Partners











