Using the EntreComp framework to evaluate an entrepreneurship program focusing on challenge based learning

Daniele Morselli, Free University of Bolzano, Faculty of Education

26 April daniele.morselli@unibz.it

This presentation

1. **EntreComp**: European Key competences for lifelong learning; EntreComp & its composition, the European Qualification Framework (EQF), key facts on policy & practice.

2. **Challenge Based Learning**: definition, key features, the real meaning of "challenge" = wicked problems

3. **The Student and Company Sprint**, Top down approach = competence framework; Bottom-up = asking the students, results & conclusions
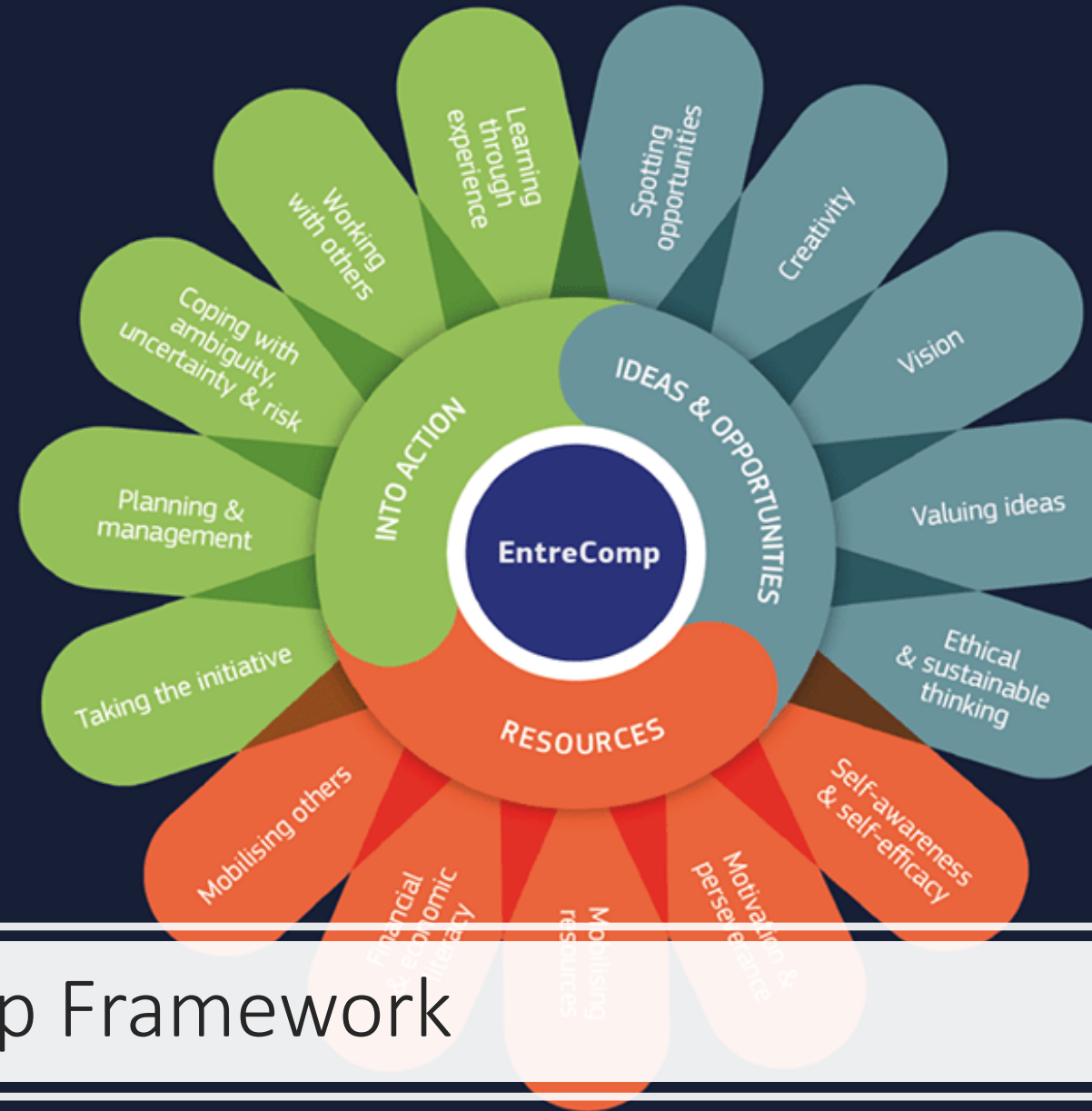
The European Key competences for lifelong learning (European Commission, 2018)

8 key competences for lifelong learning useful in many contexts: social inclusion, citizenship, full employability, self-fulfillment

Competence is defined as a **combination of knowledge, skills and attitudes** appropriate to the context

Holistic definition (the subject is taken in consideration within a context and a problematic situation where to **mobilize** his/her competences)
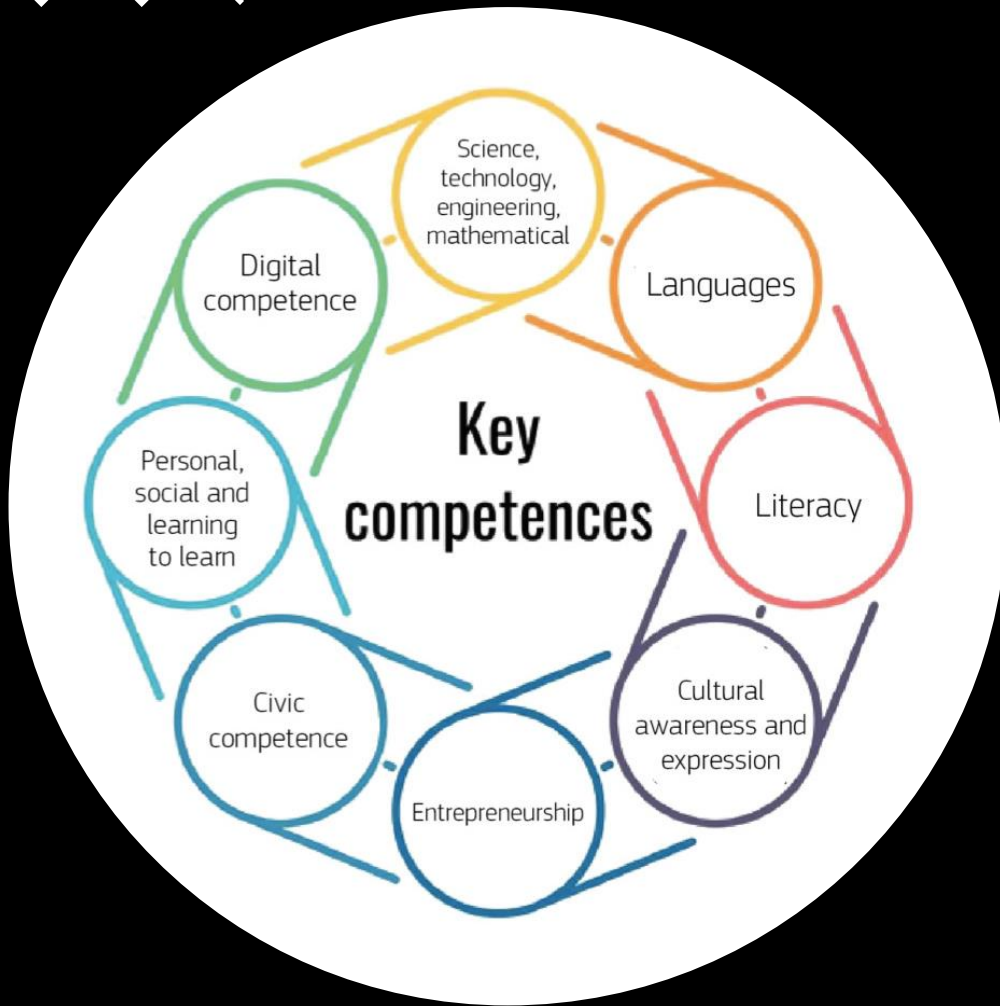
"Skilling me softly": key facts

- They represent the European **political consensus** about what a student **at the end of compulsory education** should do in a knowledge-based society (VanWoensel, 2008)

- Product of several narratives, including a **neo-liberal (economic salvation) and a social justice (human rights)** (Deakin Crick, 2008)

- Although the word curriculum does not appear in the documents, the shift towards competence and the development of the specific competences calls for **curriculum reforms in the member states** (Halász & Michel, 2011)

- The cross-curricular or transversal ethos of key competencies is not always perceived by educators, who tend to consider the first block of key competences as subject specific and **neglect the second block**   (Pepper, 2011)

- Two challenges when assessing key competences:
    - defining and "unpacking" the learning outcomes in terms of knowledge, skills, attitudes
    - broadening the methodologies to gather information on the application of competences in diverse authentic situations
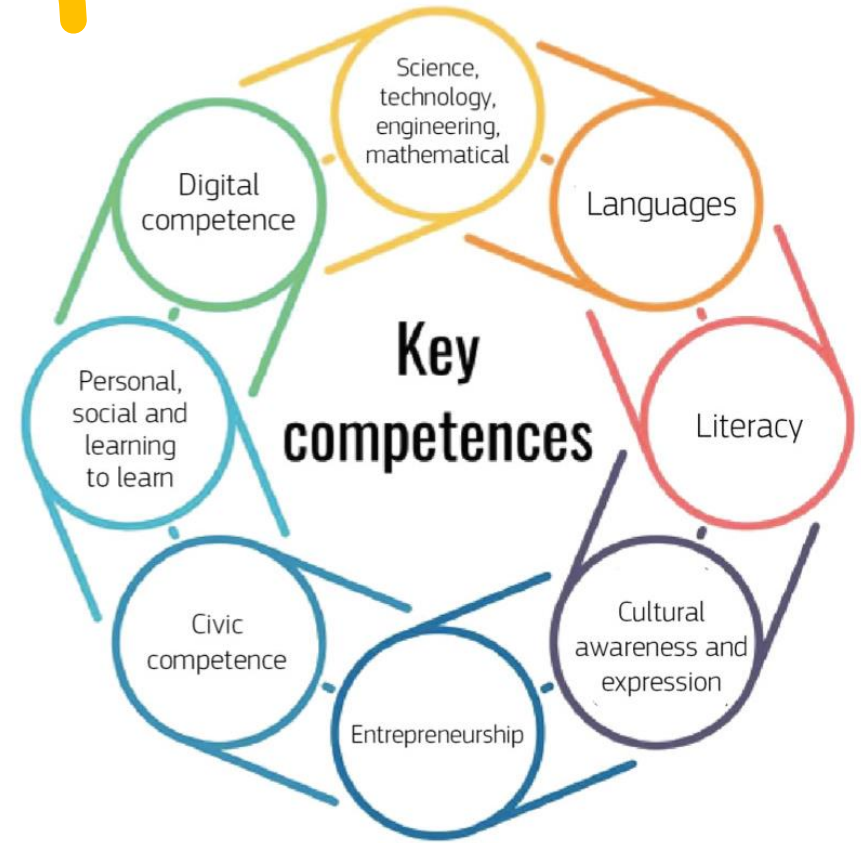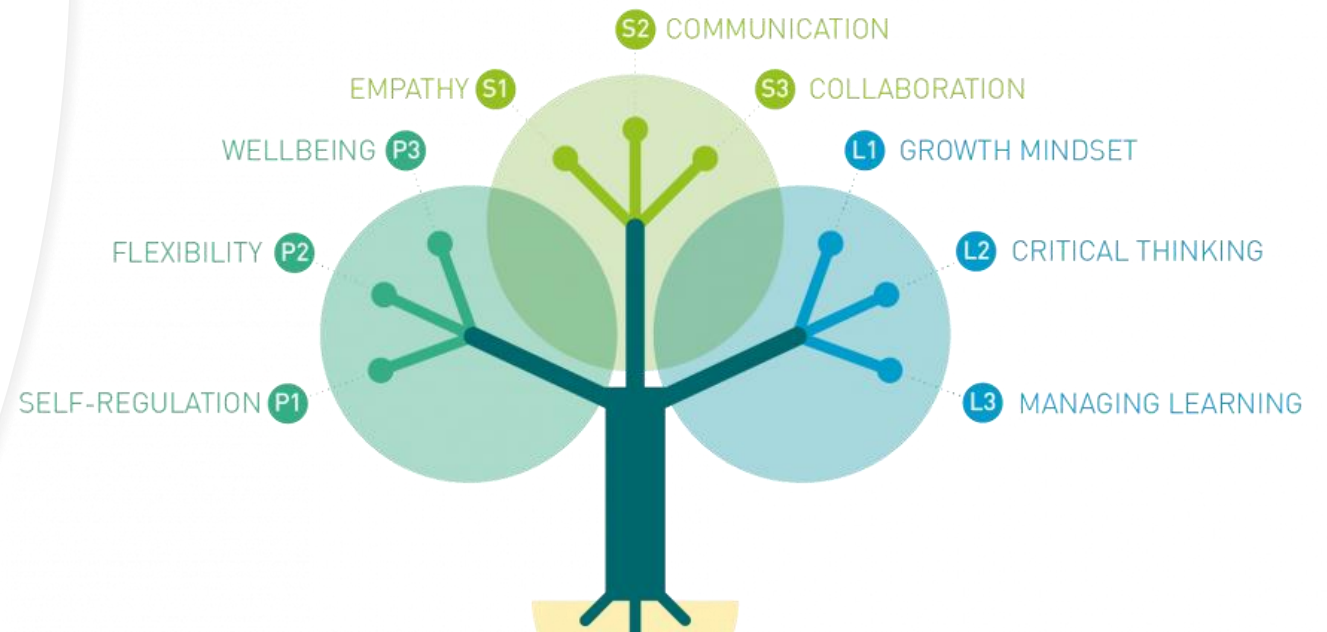
EU competence frameworks

- for languages (A basic, B intermediate, and C advanced) most successful

- Green Comp (2022) Sustainability competence framework

- DigitComp with updates 2.2. (2022) Digital Competence

- Life Comp Framework (2021) Personal Social and Learning to learn

- Financial Competence (2022) (with OCED) in adults
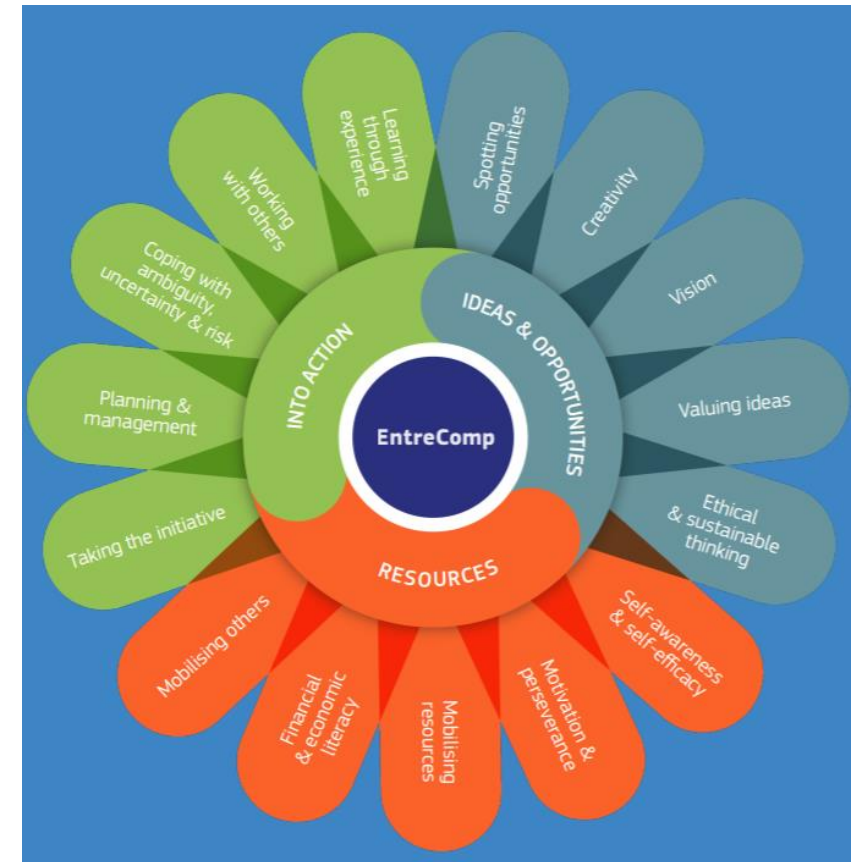
- EntreComp (2016)

The EntreComp Framework

- European Commission (2016)

- Consensus process, it defines what an entrepreneurship competence is and benchmark it"de facto"

- P: 10: **"Entrepreneurship is when you act upon opportunities and ideas and transform them into value for others. The value that is created can be financial, cultural, or social"** (FFE-YE, 2012)

- Three main areas (Ideas & opportunities; Resources; Into action), 5 competence per area, for each competence threads

- Each of the 15 competences is also expressed as learning outcomes along 8 proficiency levels to develop a progression model based on personal **autonomy and predictability**

- Overall 442 comprehensive learning outcomes.

- These 8 levels are the same of the European Qualification Framework

				Level of proficiency		Foundation		Intermediate		Advanced		Expert	
						Relying on support from others		**Building independence**		**Taking responsibility**		**Driving transformation, innovation and growth**	
				Progression		Under direct supervision.	With reduced support from others, some autonomy and together with my peers.	On my own and together with my peers.	Taking and sharing some responsibilities.	With some guidance and together with others.	Taking responsibility for making decisions and working with others.	Taking responsibility for contributing to complex developments in a specific field.	Contributing substantially to the development of a specific field.
						Discover	Explore	Experiment	Dare	Improve	Reinforce	Expand	Transform
Area	**Competence**	**Hint**	**Descriptor**	**Thread[10]**		**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**	**Level 6**	**Level 7**	**Level 8**
Ideas and opportunities	**Spotting opportunities**	Use your imagination and abilities to identify opportunities for creating value.	Identify and seize opportunities to create value by exploring the social, cultural and economic landscape. Identify needs and challenges that need to be met. Establish new connections and bring together scattered elements of the landscape to create opportunities to create value.	Identify, create and seize opportunities.		I can find opportunities to help others.	I can recognise opportunities to create value in my community and surroundings.	I can explain what makes an opportunity to create value.	I can proactively look for opportunities to create value, including out of necessity.	I can describe different analytical approaches to identify entrepreneurial opportunities.	I can use my knowledge and understanding of the context to make opportunities to create value.	I can judge opportunities for creating value and decide whether to follow these up at different levels of the system I am working in (for example, micro, meso or macro).	I can spot and quickly take advantage of an opportunity.
				Focus on challenges.		I can find different examples of challenges that need solutions.	I can recognise challenges in my community and surroundings that I can contribute to solving.	I can identify opportunities to solve problems in alternative ways.	I can redefine the description of a challenge, so that alternative opportunities address it may become apparent.	I can take apart established practices and challenge mainstream thought to create opportunities and look at challenges in different ways.	I can judge the right time to take an opportunity to create value.	I can cluster different opportunities or identify synergies among different opportunities to make the most out of them	I can define opportunities where I can maintain a competitive advantage.
				Uncover needs.		I can find examples of groups who have benefited from a solution to a given problem.	I can identify needs in my community and surroundings that have not been met.	I can explain that different groups may have different needs.	I can establish which user group, and which needs, I want to tackle through creating value.	I can carry out a needs analysis involving relevant stakeholders.	I can identify challenges related to the contrasting needs and interests of different stakeholders.	I can produce a 'roadmap' which matches the needs with the actions needed to deal with them and helps me create value.	I can design projects which aim to anticipate future needs.

Beginning of upper secondary education

Examples of knowledge descriptors for the EQF (2006)

Doctoral level

		Knowledge
		In the context of EQF, knowledge is described as theoretical and/or factual.
Level 1	The learning outcomes relevant to Level 1 are	• basic general knowledge
Level 2	The learning outcomes relevant to Level 2 are	• basic factual knowledge of a field of work or study
Level 3	The learning outcomes relevant to Level 3 are	• knowledge of facts, principles, processes and general concepts, in a field of work or study
Level 4	The learning outcomes relevant to Level 4 are	• factual and theoretical knowledge in broad contexts within a field of work or study
Level 5*	The learning outcomes relevant to Level 5 are	• comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge
Level 6**	The learning outcomes relevant to Level 6 are	• advanced knowledge of a field of work or study, involving a critical understanding of theories and principles
Level 7***	The learning outcomes relevant to Level 7 are	• 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
Level 8****	The learning outcomes relevant to Level 8 are	• knowledge at the most advanced frontier of a field of work or study and at the interface between fields

Research on EntreComp

- Review of Raţiu et al. (2023) lists 37 articles using this framework

- Baena-Luna et al. (2020) EntreComp has had scarce impact on both literature and practitioners

- López-Núñez et al. (2022) developed a self-assessment questionnaire on EntreComp. 22 questions and 742 subjects. Confirmatory analysis confirmed structure of EntreComp (Ideas and Opportunities, Personal Resources, **Specific Knowledge**, and Into Action).

EntreComp: Policy side

- EntreComp Into Action (McCallum et al., 2018) examples of inspiring practices
- EntreComp Play Book (Bacigalupo et al., 2020) with 9 pedagogical principles & signature pedagogies →
- Austria built own framework from EntreComp
- Italy: abridged version for teachers (MIUR, 2018)

2. Challenge Based Learning

Challenge Based Learning (CBL), key facts

It draws from **problem-based learning** and **inquiry-based learning** (Malmqvist et al., 2015; Lejon et. al, 2021)

History: it was first mentioned in the STAR Legacy Cycle deployed at the Vanderbilt University (Gallagher & Savage, 2020), but systematically developed by Apple (Nichols & Kator, 2008), with the aim of preparing learners to deal with the 21st Century workplace challenges

Definition: *A challenge-based learning experience is a learning experience where the learning takes places through the identification, analysis and design of a solution to a sociotechnical problem. The learning experience is typically multidisciplinary, takes place in an international context and aims to find a collaboratively developed solution, which is environmentally, socially and economically sustainable.* (Malmqvist et al., 2015, p. 1)

Features of CBL

Gallagher & Savage (2020) find eight common features:

1) it involves global themes such as sustainability;

2) it deploys "real-world" challenges;

3) it fosters collaboration between learners, people from academia and outside;

4) it makes intensive use of technology;

5) it is adapted flexibly to the context;

6) it takes a multidisciplinary approach, although it is often deployed in STEAM education

7) it develops creativity and innovation

8) it implies a challenge, that is "**a broad statement or task as a means of encouraging students to address educational criteria, fulfil competencies and complete learning objectives**" (p. 12)

- What is a Challenge? Malmqvist et al. (2015) refer to the literature on wicked problems, where "wicked" is the opposite of "tame" or domesticated (Rittel & Webber, 1973)

- Examples of such problems that are unpredictable, **complex, open-ended and intractable** (Alford & Head, 2017) can be natural catastrophes, global warming, child protection or drug abuse

Wicked problems
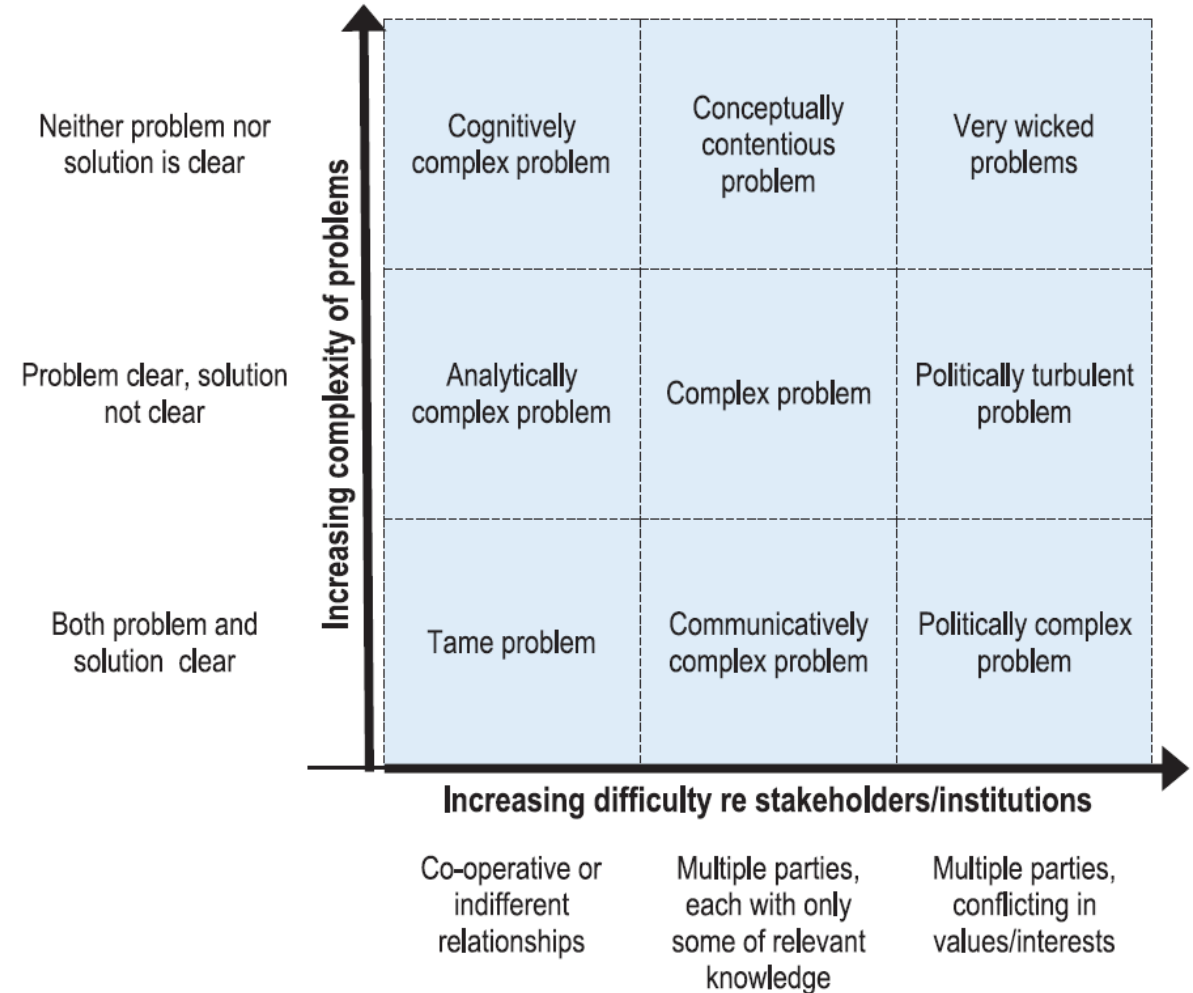
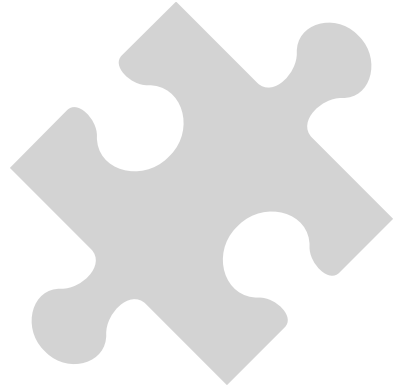Alternative types of complex problems
Alford and Head (2017)

3. Using the EntreComp framework to evaluate an entrepreneurship program on challenge based learning

STUDENT & COMPANY SPRINT

A 5 days **innovation event in February 2022** jointly organized by the Free University of Bolzano and the NOI-Tech Park (accelerator)
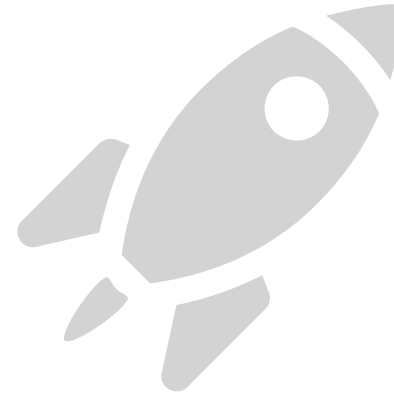
Based on **Challenge Based Learning**
Students coached by experts and instructors

6 interfaculty teams of Year 2 and 3 Bachelor and Master students

3 companies = 3 challenges
Company A: Design a concept (from offer, design, to business model) to rethink the canteen experience for students and academic staff in a circular perspective.

© FREE UNIVERSITY OF BOLZANO and NOI TECHPARK

1 University

unibz

25 Students

Bachelor 8
Master 17

5 Faculties

Science & Tech.
Education
Eco. & Man.
Design & Art
Computer Sc.

Markas   Vivius   VOG Products

12 Courses

Food Sc. for Innov. and Authenticity of Products
Social Work
Public Policies and Admin.
Ind. Mechanical Eng.
Entrepreneurship & Innov.
Energy Eng.
Eco-Social Design
Eco. & Social Sc.
Eco. & Man.
Computer Sc.
Communication Sc. & Culture
Agric., food & environmental Sc.

STUDENTS & COMPANY SPRINT

Problem: how to "measure" student' learning?

- Short treatments (30-40 hours) within weeks
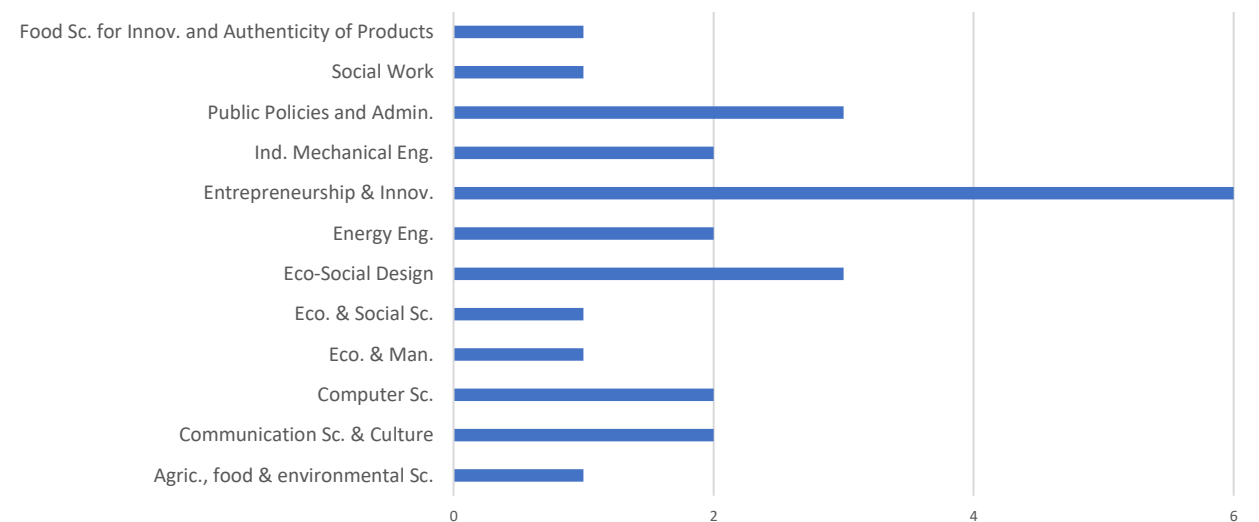- Limited number of participants (25), absence of control group
- Quantitative measurement: rarely can one expect to find meaningful differences, and even when a meaningfulness is found, what does this means in terms of education/learning? (in education, almost everything works…)
- Sometimes pre and post test lead to a situation where the pre-test is higher than the post-test (Boyas et al., 2012)

Solution

- Use of quantitative and qualitative methods
- Multiple sources of information, combining a top-down and a bottom-up approach:
  - Top-down: established frameworks such as EntreComp
  - Bottom-up approach: starting from the students

TOP-DOWN approach:
Use of established competence frameworks

Online survey at the end of the experience based on EntreComp (Self assessment) 15 competences EntreComp = 15 questions.

For each question

- Answer on a Likert scales (quantitative)
- Open ended questions (qualitative)

- Example for question "Creativity" : "*Please specify how much this experience has helped you in exploring and experimenting with innovative approaches to develop creative and purposeful ideas*".
  - Likert scale 1 = not at all, 2 = a little bit; 3 = moderately; 4 = considerably; 5 = very much
  - Open ended question: "*When and/or how did you learn this competence during this experience?*"

BOTTOM-UP approach:
Asking the students what they learnt

- Data gathering: Focus groups with students in groups at the end of the experience with questions "What have you learnt?" Would you now be able to do this 'alone' ?"

- Data analysis: according to a theory of curriculum design (Biggs' constructive alignment (Biggs et al., 2022): intended learning outcomes (verb + object and context)

1. TOP DOWN APPROACH:
USE OF ESTABLISHED LEARNING FRAMEWORKS
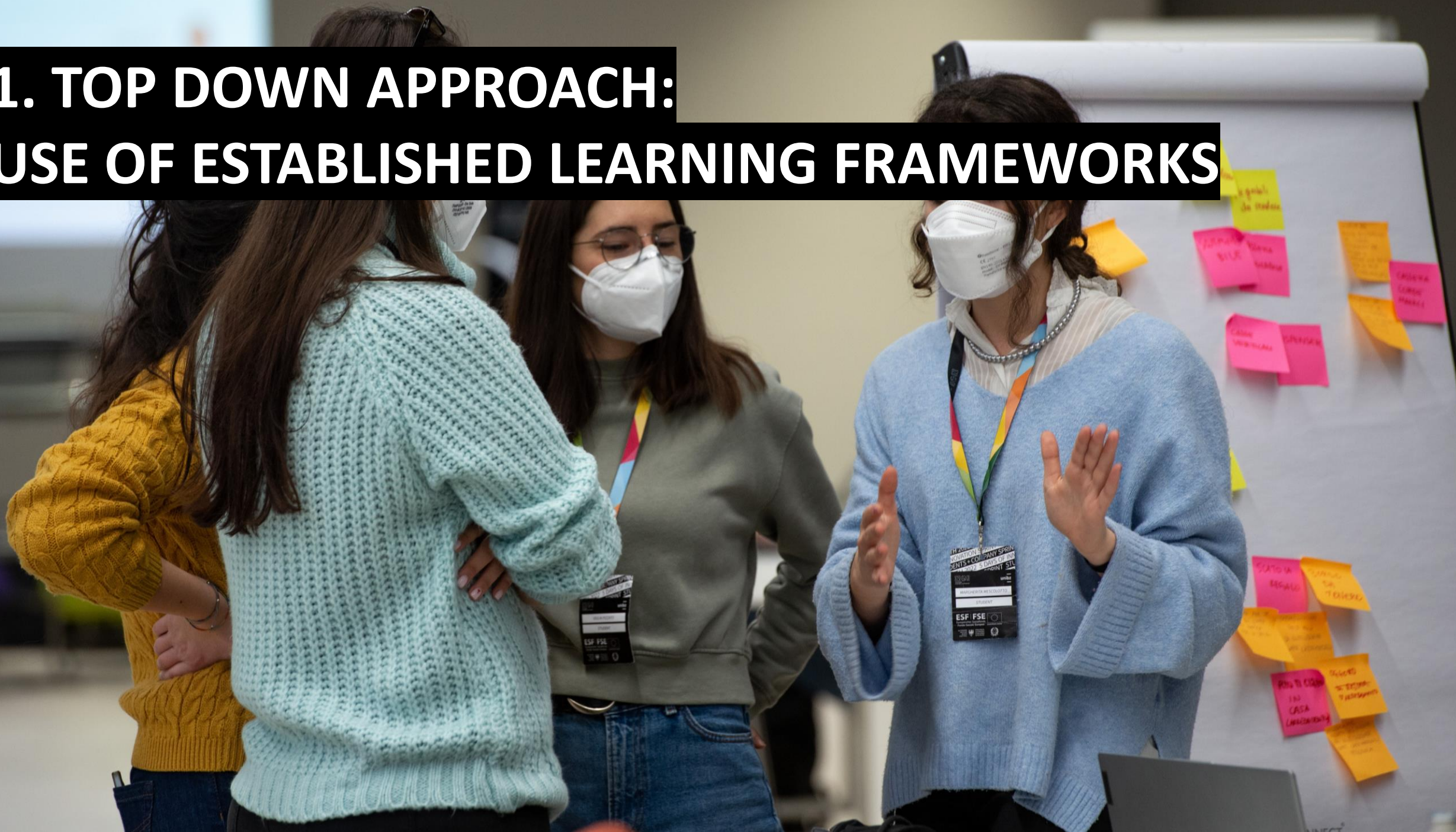
Results: Likert scales

Please specify how much this experience has helped you in developing... *[1 = not at all; 5 = very much]*

Ideas & Opportunities

Spotting opportunities · Creativity · Vision of the future · Value ideas and opportunities · Consequences of ideas

Resources

Self awareness and self efficacy · Motivation and perseverance · Mobilize resources · Economic know how · Mobilize others

Into Action

Take the initiative · Planning and managing · Dealing with uncertainty · Work with others · Learn through experience
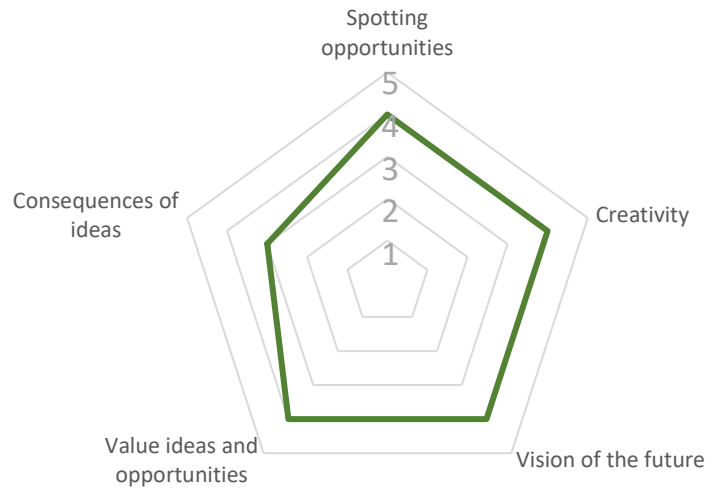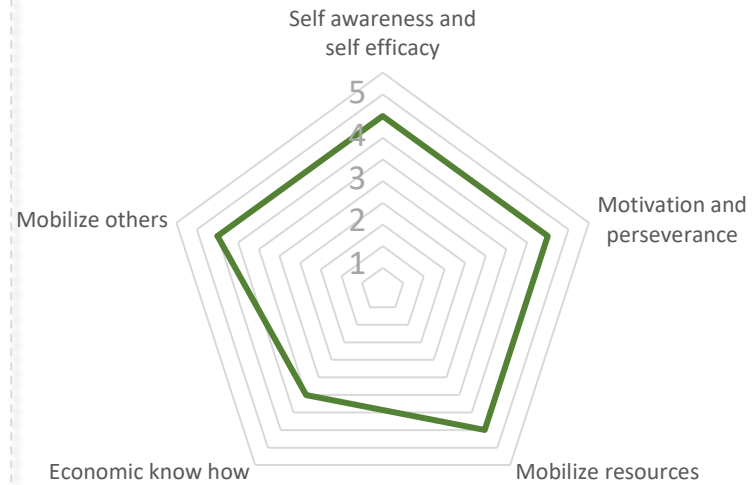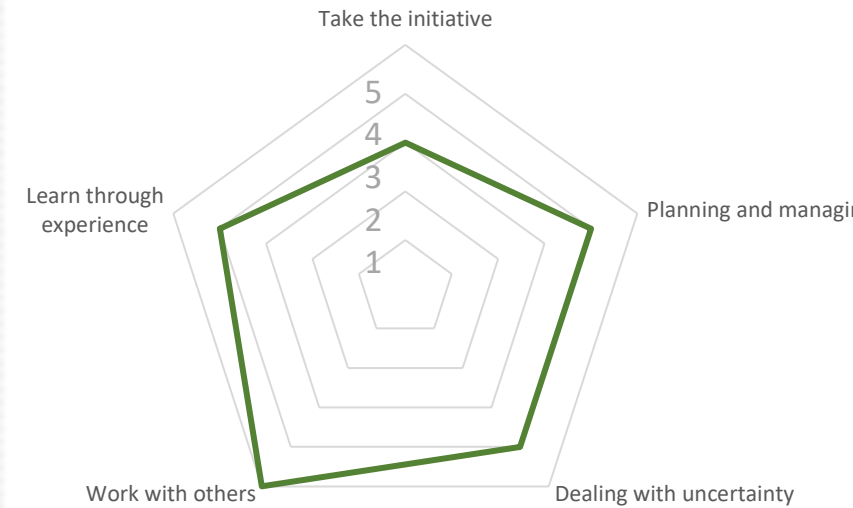
Results: qualitative analyses of the open questions

When and/or how did you learn this competence during this experience?

Qualitative answers have been coded based on their main themes
(in brackets number of students mentioning each aspect)

Ideas and opportunities	Resources	Into action
Spotting opportunities Ideation; brainstorming, crazy eight (9) Teamwork (6)	**Self-awareness and self-efficacy** Through teamwork (13) During the whole experience (7)	**Take the initiative** Through the whole process (5) Through engaging teamwork (5) I did not learn such thing (4)
Creativity Talking to experts and facilitators (8) During whole experience (4)	**Motivation and perseverance** Because of time pressure (8) I did not learn it/I was already so (5) We were interrupted too often (4)	**Planning and managing** This experience was helpful to learn planning (13)
Vision of the future It was difficult (5) With my teammates (4)	**Mobilize resources** We manged independently as team (4)	**Dealing with uncertainty** There was no real risk (5)
Value ideas and opportunities We could only focus on economic value (6) Checking with the company (6) Throughout the whole process (4)	**Economic know how** Not so much (6) Market search - business modelling (4)	**Work with others** It was central (6) Through the whole experience (5) We met awesome people (4)
Consequences of ideas We did not learn much about this (6)	**Mobilize others** Thanks to teamwork (9) We felt the challenge uninspiring (4) The pressure for the finals (4)	**Learn through experience** Through teamwork (5) During whole experience (5)

STUDENTS & COMPANY SPRINT

Comparison between open ended and Likert scales

Ideas and opportunities	Resources	Into action
Spotting opportunities (4 considerably) Ideation; brainstorming, crazy eight (9) Teamwork (6)	**Self-awareness and self-efficacy (4 considerably)** Through teamwork (13) During the whole experience (7)	**Take the initiative (3 moderately)** Through the whole process (5) Through engaging teamwork (5) I did not learn such thing (4)
Creativity (4 considerably) Talking to experts and facilitators (8) During whole experience (4)	**Motivation and perseverance (4 considerably)** Because of time pressure (8) I did not learn it/I was already so (5) We were interrupted too often (4)	**Planning and managing (4 considerably)** This experience was helpful to learn planning (13)
Vision of the future (4 considerably) It was difficult (5) With my teammates (4)	**Mobilize resources (4)** We manged independently as team (4)	**Dealing with uncertainty (4 considerably)** There was no real risk (5)
Value ideas and opportunities (4 considerably) We could only focus on economic value (6) Checking with the company (6) Throughout the whole process (4)	**Economic know how (3 moderately)** Not so much (6) Market search - business modelling (4)	**Work with others (5 very much)** It was central (6) Through the whole experience (5) We met awesome people (4)
Consequences of ideas (3 moderately) We did not learn much about this (6)	**Mobilize others (4 considerably)** Thanks to teamwork (9) We felt the challenge uninspiring (4) The pressure for the finals (4)	**Learn through experience (4 considerably)** Through teamwork (5) During whole experience (5)

2. BOTTOM UP APPROACH :
USE OF FOCUS GROUP WITH STUDENTS

STUDENTS & COMPANY SPRINT

FOCUS GROUPS

What did you learn from this experience?
(Top 3 achieved learning outcomes)

Focus group 1 (Markas)	**Work with people of different backgrounds** to design new ideas in a iterative process methodology	**Manage time and stress** and take responsibility	**Apply new tools** from my group mates (canvas)
Focus group 2 (Markas)	**Work together** and self assign tasks	**Relate to a real company** as it was a client	Design **something new that can have users**
Focus group 3 (VOG Products)	**Work together and value diversity**/heterogeneity in a team ("Alone we would not have been able to tackle the challenge").	**Interact with companies** to collect feedback on the ideas.	**Apply new tools** (Business Model Canvas, crazy 8s)
Focus group 4 (Vivius)	**Work together** on a "**real-world**" **challenge**. "Things are that otherwise **I would have never learned** before going in the job market".	**C**ommunicate (and "sell") your **ideas and** convince others about their value, and ask for the **"right" questions**	**Overcome difficulties,** even when one thinks s/he does not have the skills needed. **Apply new tools and software** (e.g., Wordpress, how to make a presentation)

CONCLUSIONS

What did the students learnt?

TOP-DOWN: EntreComp

12 competences

- Spotting opportunities
- Creativity
- Value idea and opportunities
- Vision of the future
- Self-awareness and confidence
- Motivation and perseverance
- Mobilise resources
- Mobilize others
- Planning & managing
- Mobilize resources
- ~~Learn through experience~~
- **Teamwork**

BOTTOM-UP: Acquired learning outcomes in the context of the challenge

(Focus-groups N=4)

- teamworking in heterogenous groups (4)
- applying new tools (3)
- interacting with "real world" companies (3)
- design new ideas (3)

- Manage time and stress (1)
- Take responsibility for own work (1)
- Overcome difficulties (1)

Tentative conclusions

- Substantial coherence between Likert scales and open ended questions (what is important is the question not the format with which is expressed)
- Very much difference between top-down and bottom-up, where the only point in common is teamwork
- Teamwork in this experience was the overarching process through which students learnt other skills in the context of entrepreneurship

- **EntreComp framework** proved **useful to benchmark the entrepreneurship related competences** that a program nurtures. It provides a useful **predetermined set of learning outcomes** that acts as a benchmark ("top-down" approach).
- A **more situated "bottom-up" approach** is however also beneficial to evaluate the competences developed by the students with a theory of curriculum design (e.g., based on Biggs and Tang's (2011) constructive alignment
- Open question on how to bring coherence these two approaches, more research is needed

- The next challenge will be certifying entrepreneurship competence. Using EntreComp and the 8 EQF levels will be beneficial for improving student's employability. However, this cannot be done with the exclusive use of self-assessment tools such as an online survey. Use of observation/portfolios with artefacts and interviews.

Thank-you for your attention