



The assessment of students' entrepreneurship competence: Results from an interfaculty event based on Google Design Sprint

La valutazione della competenza imprenditoriale degli studenti: Risultati da un'iniziativa interfacoltà basata su Google Design Sprint

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ABSTRACT

This contribution assesses the entrepreneurship competence that students cultivated during an interfaculty and innovative initiative grounded on Google Design Sprint methodology. It adopts a combined set of tools to gather data, including an online questionnaire leaning on the EntreComp framework, with both Likert scales and open-ended questions, as well as focus groups asking the participants what they learnt during the initiative. The analyses triangulate both descriptive statistics and thematic analysis. Results contend that the most important competence cultivated is groupwork in heterogenous groups, while a notable offshoot is the nurturing of diverse EntreComp related competences. The conclusions argue that EntreComp is suitable to assess competences from a prescriptive approach, i.e., as standard, especially when it is combined with a contextual approach such as the theory of constructive alignment, focusing on performance and on the learning outcomes students achieved.

Questo contributo valuta la competenza imprenditoriale sviluppata dagli studenti durante un programma innovativo e interfacoltà basato sulla metodologia Google Design Sprint. Adotta un set combinato di strumenti per raccogliere dati, incluso un questionario online basato sul framework Entrecomp, e dotato sia di scale Likert che di domande aperte, come pure focus group su quello che i partecipanti hanno appreso durante l'iniziativa. Le analisi triangolano sia le statistiche descrittive che le analisi tematiche. I risultati suggeriscono che la competenza più importante sviluppata durante questa esperienza è il lavoro di gruppo in team eterogenei, anche se i partecipanti hanno sviluppato diverse altre competenze connesse a EntreComp. Nelle conclusioni si argomenta come questo framework sia indicato per valutare le competenze da un punto di vista prescrittivo, cioè come standard, specialmente quando combinato a un approccio più contestuale come la teoria dell'apprendimento costruttivo, che si focalizza sulla performance e sui risultati di apprendimento acquisiti dagli studenti.

KEYWORDS

Google Design Sprint, Problem-based learning, EntreComp framework; Entrepreneurship education, program evaluation
Google Design Sprint, Problem-based learning, Framework EntreComp, Educazione all'imprenditorialità, valutazione di programmi

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1. Introduction

In recent years, educators have experimented with constructive pedagogies for competence development based on authentic problem-solving situations, working in groups, and purposeful learning (Hattie, 2008; Koenen et al., 2015; Panigua & Istance, 2018). At the same time, frameworks such as *EntreComp* have been developed to define what an entrepreneurship competence is (Bacigalupo et al., 2016; Bacigalupo, 2022). This paper sets out to evaluate an innovative entrepreneurship and interfaculty program called *Student & Company Sprint* delivered through *Google Design Sprint* methodology. This initiative was jointly organised by an organization providing innovation services and a university. To evaluate this initiative, the paper makes use of an online survey based on Likert scales and open-ended questions based on the *EntreComp* competences, as Morselli and Gorenc (2022) did. To take evaluation of entrepreneurship programs to the next level, it also makes use of focus-groups to investigate the learning outcomes that the participants developed during the program. It makes so through the constructive alignment theory (Biggs & Tang, 2011; Biggs, 2014).

The paper starts by reviewing the *EntreComp* framework and the theory of constructive alignment for course design. Next, it explores the literature on problem-based learning, the pedagogy entailing the pedagogical principles *Google Design Sprint* is based on. Subsequently, it presents the research methodology, that is qualitative evaluation and case studies. It continues by presenting the *Student & Company Sprint* event and the results from the online surveys and the focus groups. Subsequently it discusses the results and provides conclusions. Thus, although this paper is designed to understand what the students learned in terms of an entrepreneurship competence, it also ponders the effectiveness of *EntreComp* to evaluate innovative entrepreneurship programs.

2. Literature review

2.1 *EntreComp*, a framework for entrepreneurship as key competence

Societies around the world are undergoing rapid and deep changes. The economic, societal, as well as climate challenges humankind will have to deal with in the next decades are unrivalled and unparalleled in human history (OECD, 2018). Against this background, education should play an essential role in cultivating strategic key competences in individuals, thus helping them identify novel solutions for a sustainable and inclusive future. In this context, competence-based education becomes key. It was introduced at the tertiary level to fill the gap between what was taught in the classes and what the labour market needed (Mudler & Winterton, 2017), hence promoting a switch from the transmission of disciplinary knowledge to its application in real-world situations (Koenen et al., 2015). Competence-based education can be delivered by promoting students' self-regulation and autonomy, by using realistic tasks that are meaningful for the learners, by coaching and mentoring learners, and by

having them reflecting on their performance. In this context, the *Learning Framework for 2030* (OECD, 2018, p. 5) puts forward three "transformative competences" that each young person should develop to be aware, innovative and responsible. Such key competences are: to reconcile dilemmas and tensions, to take responsibility, and to create value. Similarly, the European Commission (2019) launched eight key competences that are essential for lifelong learning, both in the workplace and in private life. A key competence consists of a context appropriate combination of knowledge, skills, and attitudes. Entrepreneurship is therefore one of these key competences for self-fulfilment, citizenship, employability and inclusion.

The *EntreComp* Framework put forward by Bacigalupo et al. (2016) sought not only to reach an agreement on a shared comprehension about this key competence, but also to become a benchmark for research and practice. It identifies three areas (*Ideas & Opportunities*, *Resources*, and *Into Action*), and, for each of these areas, five sub-competences with three descriptors, eight proficiency levels, for a total of comprehensive 442 learning outcomes. The European Commission has injected efforts to foster its application, one example being the *EntreComp Play Book* (Bacigalupo et al., 2020), a guide entailing educational principles, tools and signature pedagogies to nurture entrepreneurship as key competence. Results, however, have not been so promising (Baena-Luna et al., 2020), given that the framework has caused little impact on literature and practice. In the meanwhile, however, some research has been carried out. López-Núñez et al. (2022), for example, designed a quantitative tool for self-assessment, making a confirmatory analysis of the framework, while Morselli and Gorenc (2022) developed a qualitative questionnaire based on this framework and tested it to compare two courses based on the *Korda* method.

Furthermore, beyond the *EntreComp* framework, a theory for curriculum design is also necessary to design an entrepreneurship course triggering deep learning in students (Morselli, 2018; Morselli & Gorenc, 2022). Biggs' (2014) constructive alignment, for example, is a theory of course design, and prescribes a coherence between the envisioned learning outcomes, the learning and teaching activities, as well as the assessment practices. According to Biggs, the focus of good teaching is neither on the student nor on the topics to cover, rather on what the students must perform to reach the established learning outcomes. Teacher centred pedagogies such as lectures do not necessarily foster students' engagement, students may become passive and therefore activate surface learning approaches. Conversely, by switching the focus on the students' intended learning outcomes, learners are put at the centre of the learning process, and, through engaging in activities, they actively construct their knowledge (Biggs & Tang, 2011).

Such activities can be based on the *SOLO* (*Structure of the Observed Learning Outcome*, Biggs & Collis, 1989), a taxonomy suggesting a set of cognitive activities reflected by verbs such as to "apply", "reflect", "evaluate" and "explain" useful to promote engagement and deep learning processes in learners. These verbs are useful to design intended learning outcomes, that the teaching and learning activities as

well as the assessment will mirror (Biggs, 2014). In so doing, the students will be likely to engage in the appropriate teaching and learning activities and, consequently, develop the learning outcomes envisioned by the educator, provided that “unintended” learning outcomes may also arise. It is crucial that, for constructivist pedagogies to have their optimal impact, the student (and not the teacher) must perform the teaching and learning activities: As a result, the main role of the teacher becomes to design learning environments (Paniagua & Istance, 2018). This point is elaborated upon in the next section, which introduces problem-based learning, a student-centred pedagogy promoting competence development (Koenen et al., 2015) as well as deep learning, as intrinsically aligned (Biggs & Tang, 2011). This pedagogy provides the educational principles that ground Google Design Sprint.

2.2 Problem Based Learning and Google Design Sprint

Problem based learning “is perhaps the most innovative instructional method conceived and implemented in education” (Hung, 2009, p. 118). Similarly, Savery (2015, p. 9) maintains problem-based learning is an “instructional learner-centred approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem”. For Barrows (1986), considered by most the father of this pedagogy (Hung, 2009), problem-based learning has six characteristics:

- Learning is centred on students,
- Learning happens in small groups,
- Instructors become guides or facilitators,
- Problems form backbone and stimuli to learn,
- Problems become the middle through which problem-solving skills are nurtured,
- Self-directed learning allows the acquisition of new information.

Gijbels et al. (2005), however, point out how difficult it is to clearly define problem-based learning, since it can be adapted according to the domain where it is applied and the goal of the program. In a metaanalysis, Dochy et al. (2003) find that problem-based learning has a robust effect on the students’ competence rather than on their knowledge, and that possible moderators for learning are: type of assessment, students’ level of knowledge, and retention period. In their review, Gijbels et al. (2005) focus on assessment, and recommend that it is carried out with realistic tasks that are novel to the learners, and that, at the same time, require them to integrate and apply knowledge.

Moving to Google Design Sprint, this is a time-constrained innovation method developed at Google by Knapp et al. (2016) that sets Barrow’s (1986) principles of problem-based learning into motion. Knapp et al. (2016) designed this method by observing internal projects and making use of the Design Thinking principles, and by involving the customer in the process, as Stanford University or IDEO do (Richter et al., 2018). The objective is to solve problems related to the development of new products and services, by cyclically

prototyping and interacting with possible customers and users. Google Design Sprint consists of five phases that can be divergent or convergent, and ideally take place over five intensive and consecutive days (Knapp et al., 2016):

1. Understand the problem. Share information, discuss and ask the experts aiming to circumscribe the problem, mapping its space and creating a shared base of knowledge.
2. Sketch solutions, to generate a broad range of ideas and narrow them down.
3. Decide the idea that will be prototyped.
4. Prototype and create a realistic Minimum Viable Product.
5. Validate, to test the product with key users and solicit their feedback.

These stages are supported by a set of tools and frameworks, such as the Osterwalder’s (2015) value proposition canvas for the understanding phase; the Crazy 8s, the dot-voting, the storyboard for the sketching phase; and eventually the Javelin Experiment Board for the validation phase. While at present there is systematic review on Google Design Sprint, Wangsa et al. (2022) compared Design Thinking, Agile and Design Sprint; the authors find that these methods share many communalities, since they put the primacy on collaboration, searching for information, solving problems, and involving final users in the design process, which is coherent with problem-based learning. Concerning the use of Google Design Sprint for entrepreneurship, Magistretti et al. (2023) compared 41 Sprint events to inspect how process entrepreneurial opportunities emerged and developed during the design process.

3. Case studies for program evaluation

3.1 Methodology

In many countries, the evaluation of courses and pedagogies is a widespread practice at the tertiary level. The tool to gather data are often surveys; the data obtained are subsequently elaborated quantitatively (Viganò, 2020). This form of evaluation, however, proves problematic, since it is not uncommon for students to consider surveys as routines: as learners do not pay attention when filling them in, the impact on improvement turns to be limited (Bassett et al., 2017). Furthermore, beyond quantitative surveys, tertiary education needs qualitative approaches to course evaluation (Mortari and Silva, 2020; Viganò, 2020). Beyond quantitative approaches, students could be, hence, trained to provide meaningful feedback, and be involved in the assessment process, for example, by sharing tasks and responsibilities (Castoldi, 2012; Golding & Adam, 2016). In this way, meaningful qualitative feedback can be sought: Hattie (2009), for instance, maintains that the feedback going from the student to the teacher (rather than the opposite) is the most meaningful, as it is the only means of making good teaching “visible”.

Moreover, Dahler-Larsen (2018) considers evaluation an example of socially embedded, interactive and contested practice that calls for the methods of qual-

itative research. The author suggests considering the following issues in qualitative evaluation research: a) the object of evaluation also called *evaluand*; b) the values to be considered, i.e., where the important standards come from; c) the way evaluation will be deployed; d) the methodology used to generate knowledge. In this regard, the methods to gather data are the same of inquiry, the most frequent being interviews, observations, focus groups, and analysis of documents. The evaluative research presented in this contribution makes use of the case study methodology, which entails studying a contemporary and real-life case that is limited in time and space (Yin, 2014). The author sees case studies as meaningful in evaluation research, as researchers through them can explain cause and effect of interventions in authentic contexts, which would prove impossible to study through experiments. Evaluative case studies are also advisable when a program or an intervention presents a wide and fuzzy set of possible outcomes, which is the case of this explorative study. Eventually, the case study methodology suits well entrepreneurship (Blenker et. al, 2014), since by inspecting both process and outcome, it fosters robustness, depth and richness of the study.

3.2 The case study

The Student & Company Sprint event was organised thanks to a cooperation between a university located in a mountainous zone in northern Italy and an organization owned by the municipality and providing innovation and start-up services, including a business incubator. The initiative lasted five intensive days at the end of February 2022, and involved 25 students from 5 faculties and 13 study courses. The students were first split into three groups and assigned to a different challenge based on the preferences expressed in the enrolment phase. The first day in the morning they visited their company and were given the challenge. Subsequently, each group was split into two groups of 4-5 students each, so that eventually there were six groups, two working on each challenge. The groups were made by the organisers, with the intention of maximizing heterogeneity in terms of faculty, Bachelor vs. Master course, as well as gender. Facilitated by external experts (one for each challenge, plus one coordinator) specialising in Google Design Sprint, the students worked for five full days on the challenge, and eventually pitched their solutions the last day. These are the challenges:

- *Case A*: Make a plan starting from offer and design to the business model, thus reshaping the customer experience of the university's canteen from a circular perspective.
- *Case B*: Generate a solution to back buyers and contractors to build structures according to the circular economy, by taking into consideration: materials, supply chain, and environmental footprint.
- *Case C*: In the context of apple cooperatives, their partners and consumers, generate solutions to reduce the environmental impact caused by logistics.

While company A specialises in food services, company B specialises in the building and construction sector, company C is a cooperative of apple farmers.

3.3 The evaluation research

Following the issues to be considered in qualitative evaluation research (Dahler-Larsen, 2018), we chose to focus on the students' learning as *evaluand*. The value was a broad and progressive view of entrepreneurship to be cultivated as key competence for lifelong learning, therefore useful in many life and work contexts (European Commission, 2018). Regarding the scope, since the Student and Company Sprint initiative was extracurricular and could only be mentioned in the diploma supplement, evaluation was only formative and used as feedback to make learning "visible" (Hattie, 2009) and use it to improve the following edition of the program. The last aspect are the instruments for the evaluation were online surveys and focus groups at the end of the initiative, the data being used according to a qualitative perspective as Viganò (2020), Mortari and Silvia (2020) maintain.

Concerning the online survey, it was made of 15 questions based on the *EntreComp* competences. For each question, the students through Likert scales rated how much they thought they had learned that competence (1 = not at all, 2 = a little bit; 3 = somewhat; 4 = considerably; 5 = very much). These questions were almost identical to the descriptors of *EntreComp*. In the case of spotting opportunities, for instance, the question was: "Please specify how much this experience has helped you in using your imagination and identifying opportunities to create value for others". In a subsequent open-ended question, the survey asked when and where the students had cultivated such competence. In the focus groups we conducted we asked students what they thought they had learned during the week, and what they thought they would be able to do alone.

3.4 Data analysis

The online surveys were scrutinised as follows:

- a) Likert scales, with descriptive statistics and radar charts to detect possible trends; for the use of quantities in inquiry see Yanchar (2011).
- b) Open-ended answers, by searching the number of occurrences of key words at the level of the overall text.
- c) Open-ended answers: with a thematic analysis at the level of each answer.

In (b), we searched for key terms in the open-ended answers considered as a whole text. Key terms were related to the challenge or *EntreComp*, the threshold was 5 occurrences for a term to be included into the cloud.

Concerning thematic analysis of (c), first each author independently read the answers multiple times to search for common themes. Subsequently we met to find agreement about common themes, and only

the categories with at least 4 occurrences were considered. In this way we sought to assure data validity of data in terms of rigour and intersubjectivity (Ravitch & Carl, 2019). As far as focus groups, the scrutiny was based on constructive alignment and Biggs and Tang's (2011) suggested approach to write intended learning outcomes, that is, verb plus context plus content. Instead of aiming for long and often useless lists, we centred the analysis on the most relevant three learning outcomes achieved by students, as constructive alignment contends.

4. Results

4.1 Descriptive statistics

The following paragraphs present first results of the online surveys, then the focus-groups. Concerning the Lickert scales from the online surveys, *Figure 1* shows the medians describing the 15 competences, which are split into the three area of EntreComp.



Figure 1. Competence development according to EntreComp (from 1 “not at all” to 5 “very much”)

The average level for all three areas was “considerably” (4), however, the participants state they learnt group work “very much” (5), and only “moderately” (3) “economic and financial literacy”, “take the initia-

tive”, and consider the “consequences of idea”. Picture 2 differentiate students perceived competence development across the diverse challenges.

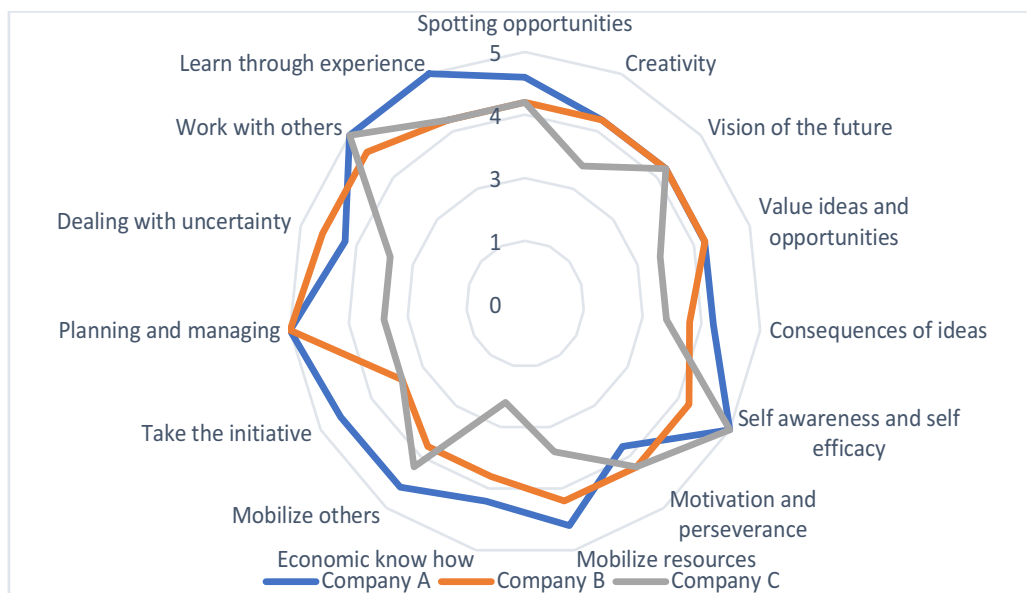


Figure 2. Students’ perceived competence by challenge

A possible overall trend could be that the students of company A felt they developed their entrepreneurship related competences the most, followed by company B, and finally company C. The subsequent radar

chart (*Figure 3*) compares students perceived competence development by faculty (faculties with less than 5 answers were aggregated into the category “Other”).

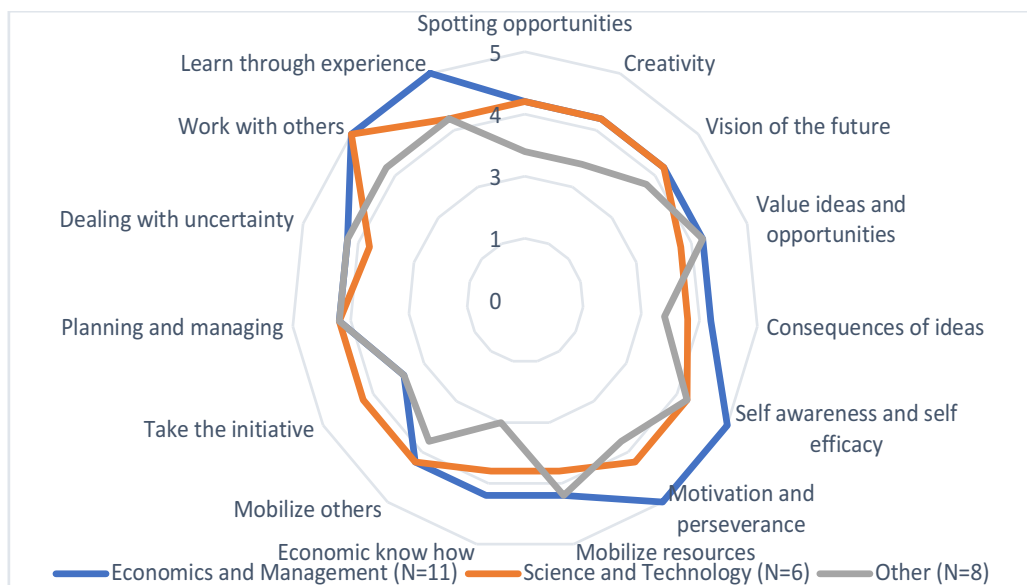


Figure 3. Students' perceived competence by faculty

A possible overall trend could be that the learners from Economics and Management felt they developed their entrepreneurship competence the most, followed by the students belonging to Science and Tech-

nology, which were then followed by the remaining faculties. The radar chart of Figure 4 displays the students' acquired competence by study level.



Figure 4. Students' perceived competence by study level

A possible overall trend could be that master students felt they nurtured their entrepreneurship competence more than the bachelor students. Figure 5, eventually, presents an overall analysis of the online surveys as a whole text and shows the most meaning-

ful terms as related to the challenge or the EntreComp framework. Results are shown in form of word cloud, in which the bigger the key term is, the more occurrences we found in the text.



Figure 5. Analysis of key terms

The words recurring the most are: “idea” (61 times), “day” (58), “team” (52), “time” (47), “group” (41). Overall, “time” related concepts (“day” + “time” = 105), “group work” (“group” + “team” = 93) and “idea” (61) are the three most recurring concepts. Eventually, *Table 1* summarises the analysis of the focus groups and lists the most important learning outcomes developed by the groups.

4.2 Thematic analyses

Table 1 shows the analysis of the open-ended answers centred on the 15 EntreComp competences. The columns represent the competence areas, while the rows the competences. For each theme identified, the number into brackets corresponds to the occurrences we identified in the text.

Area ideas & opportunities	Area resources	Area into action
Spot opportunities Crazy Eight, ideation, & brainstorm, (9) Groupwork (6)	Self-efficacy & self-awareness Thanks to groupwork (13) In the entire experience (7)	Take the initiative Through the entire process (5) Through engaging in groupwork (5) I did not learn this (4)
Creativity Talking with facilitators and experts (8) In the entire experience (4)	Perseverance & motivation Because of time urgency (8) I was already so & I did not learn this (5) We were often interrupted (4)	Manage & Plan We learn how to plan (13)
Vision of the future It was hard (5) Thanks to group members (4)	Mobilise resources We managed this as a group independently (4)	Deal with uncertainty We found no real risk (5)
Value opportunities and ideas Only economic value (6) Seeking feed-back by the company (6) Through the entire process (4)	Economic & financial know-how Not so much (6) Business modelling & market search (4)	Work with others It was key during this experience (6) Through the entire experience (5) We met nice fellows (4)
Consequences of ideas I did not learn this (6)	Mobilize other people Thanks to groupwork (9) The challenge was uninspiring (4) The stress for final presentations (4)	Learn through the experience Thanks to groupwork (5) In the entire experience (5)

Table 1. Qualitative analysis of the open-ended answers

In the analysis, groupwork appears in seven different competences. There are also competences that the students felt they did not develop so much. Con-

versely, diverse competences were developed through the whole process. *Table 2* displays the result of the focus groups.

Case	Learning outcomes achieved by students		
A (first group)	Work with people from different backgrounds to conceive ideas iteratively	Manage stress and time, and take responsibility	Apply novel tools learnt from groupmates (such as Model Canvas)
A (second group)	Work together and assign tasks on our own	Relate to a real company as they were clients	Design something novel that has users
C (two groups together)	Work together and value our diversity and heterogeneity	Interact with companies and collect feedback on the ideas.	Apply novel instruments (Crazy 8s, Business Canvas, etc.)
B (two groups together)	Work together on an authentic challenge	Communicate ideas and convince others about their value.	Overcome obstacles and apply novel software and tools

Table 2. Focus groups with learners on the learning outcomes developed during the initiative

The students report learning outcomes in the context of the Design Google Sprint experience mainly connected to group work in heterogeneous groups; interact with companies; and apply novel instruments.

5. Discussion of the results

This section seeks to make sense of the data (Ravitch & Carl, 2019) by combining the descriptive statistics and the qualitative analysis with a triangulation approach (Flick, 2018). In terms of learning, a key achievement is the students' ability to work in inter-faculty groups. This result is suggested by: (a) the Likert scales (*Figure 1*), where learners contended they cultivated "very much" to work in groups; (b) the text analysis of key terms (*Figure 5*), with words such as "group" and "team" as most important terms recurring in the data set; (c) the qualitative analysis of the open ended answers (*Table 1*), in the competence "groupwork", with themes like "throughout the whole experience" and "it was central"; (d) the focus groups (*Table 2*), since group working is the first learning outcome in all groups. In this regard, the focus groups also testify for an increased ability to work in heterogeneous groups i.e., made by students coming from different faculties.

Moreover, looking at the radar charts (*Figure 1*) and qualitative analysis of the open-ended answers (*Table 1*) it can be argued that through group work students developed other seven EntreComp related competences, i.e., spotting opportunities, vision of the future, self-awareness & self-efficacy, mobilising others, learn through experience. This is because in these competences "group work" in *Table 1* emerged as theme. By way of contrast, the radar charts (*Figure 1*) suggest that EntreComp competences like "consequences of ideas", "economic know-how" and "taking the initiative" where the competences students develop only "moderately" (3). This is confirmed by the qualitative analysis of the open-ended answers (*Table 1*), with themes such as "I did not learn much about this", "not so much", or "I did not learn such thing".

Another central issue of this experience is the role of time, as reported in the analysis of key words (*Figure 5*) with a total of 105 occurrences. The qualitative analysis of the open-ended answers (*Table 1*) also aligns with open ended answers of the students' open

answers shows time urgency, with themes such as "because of time pressure" (in "perseverance and motivation") and "the pressure for the finals" (in "mobilise others"). This time pressure is in line with the Google Design Sprint methodology timeframe and recursiveness (see Knapp et al., 2016). The open-ended answers also suggest possible shortcomings of the experience such as "it was difficult" (in the competence vision of the future); "we were interrupted too often" ("perseverance and motivation") and "the challenge was not inspiring" ("mobilise others") that should be considered for future editions.

Another interesting result is that of *Figure 2*, suggesting that the challenge influences students' learning. Coherently with Hung (2009), a challenge has to be straightforward and open enough (i.e., without too many constraints) to trigger learning. Moreover, there seems to be differences according to faculty (*Figure 3*), and Bachelor vs. Master level (*Figure 3*). In the case of students of Economics and Management, they had already participated in similar challenge-based experiences and had already applied similar tools, which allowed to nurture their competences more than the students coming from other faculties. Our hypothesis is that in general, the master students benefited more from the experience than the bachelor students since they had a deeper base of knowledge that could be turned into competence. On the one hand, this confirms the importance of previous knowledge to develop competence by applying it in practice (Koenen et al., 2015; Mudler & Winterton, 2017); on the other hand, this also supports the claim that knowledge plays an important role in problem-based learning as moderator of learning (Dochy et al. 2003).

Eventually, the students' focus groups (*Table 1*) evidenced verbs for learning outcomes such as "design", "interact", "apply", which are described in the SOLO taxonomy (Biggs & Collis, 1989) as indicators of engaging activities promoting deep learning. In addition, the students' activities of answering open-ended questions and participating in focus groups was also a teaching and learning activity (to reflect on experience) that contributed to promote deep learning. These findings are in line with the meta-analysis carried out by Hattie (2009) stating that PBL puts an emphasis on deep learning activities rather than on surface knowledge.

6. Conclusions

This study sought to better evaluate an interfaculty entrepreneurship program based on Google Design Sprint. In our experience, having participants doing a pre-test and post-tests often leads to no statistical meaningfulness, or the students' evaluations of the post-tests are lower than the pre-test, for methodological considerations see Boyas et al. (2012). Furthermore, a statistical meaningfulness does not indicate what the students learned: Hattie (2009), for example, advocated using the concept of effect size to find how strongly a pedagogy promotes learning, thus collecting evidence on what works best in education. This paper made a qualitative evaluation of a program coherent with the literature (Viganò, 2020; Mortari and Silva, 2020). In line with Dahler-Larsen (2018) the program was evaluated through a multidimensional approach with a final survey based on EntreComp and focus groups based on constructive alignment. The use of descriptive statistics and thematic analyses, and their triangulation (Flick, 2018) allowed to get a full picture of what the students learnt during the experience.

This study proves the usefulness EntreComp to benchmark the entrepreneurship related competences that a program nurtures, as Morselli and Gorenc (2022) already found. Further, results obtained through the Likert scales and the open-ended answers support each other. By using focus groups, however, this research brings program evaluation to the next level: the EntreComp Framework of Bacigalupo et al. (2016) provides a useful predetermined number of competences that function as standard, that is with a "top-down" approach typical of policies. This, however, may not match the specific competences developed by students in a certain program. Hence, a contextual "bottom-up" approach based on performance is also necessary to evaluate the learning outcomes acquired by students. In this case study, for example, the focus groups revealed that the students developed communication competences to interact with companies as they were possible clients, and this competence is not included in EntreComp. Moreover, analysing the focus groups through the constructive alignment theory allows to connect the learning outcomes with the context where they have been developed. From the methodological point of view, this paper, therefore, argues to combine a top-down approach with a bottom-up approach, which could be Biggs' (2014) constructive alignment. While EntreComp provides a benchmark "de facto" on what an entrepreneurship competence is (Bacigalupo et al., 2016), constructive alignment focuses on the learning process, what the students performed during the learning activities, as well as their intended learning outcomes (Biggs and Tang, 2011).

Eventually, the learning outcome developed the most in the context of the Student & Company Sprint event is the capability to work in heterogeneous groups. This is in our view the most valuable learning, the fact the students appreciated working with students from other faculties, and hence who brought different perspectives. This connects to educating for an entrepreneurship competence as a lifelong learning competence for citizenship and inclusion (Euro-

pean Commission, 2019). Moreover, this learning outcome is also coherent with the Learning Framework for 2030 (OECD, 2018), where working in heterogeneous groups deals with learning how to reconcile tensions and dilemmas. Overall, in line with Koenen et al. (2015), Biggs and Tang (2011) and the EntreComp framework (Bacigalupo et al., 2016; 2022) results suggest that as progressive pedagogy, Google Design Sprint (as type of problem-based learning) promotes students' engagement and deep learning, as well as the development of an entrepreneurship competence as key competence for lifelong learning.

Bibliography

- Bacigalupo, M. (2022). The European Entrepreneurship Competence Framework (EntreComp). A Conceptual Model Built and Tested by the European Commission's Joint Research Centre. *Journal of Creative Industries and Cultural Studies*, (4), 38-53. <http://hdl.handle.net/10760/43287>
- European Commission, Joint Research Centre (European Commission), Bacigalupo, M., Kamyliis, P., Punie, Y., & Van den Brande, G. (2016). *EntreComp: The Entrepreneurship Competence Framework*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2791/593884>
- Bacigalupo, M., Lilian, W. G., Yashar, M., & O'Keeffe, W. (2020). *EntreComp Playbook: Entrepreneurial Learning Beyond the Classroom*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2760/77835>
- Baena-Luna, P., García-Río, E., & Monge-Agüero, M. (2020). Entrecomp: marco competencial para el emprendimiento. Una revisión sistemática de la literatura sobre su uso y aplicación. *Información Tecnológica*, 31(2), 163 – 172. <http://dx.doi.org/10.4067/S0718-07642020000200163>
- Bassett, J., Cleveland, A., Acorn, D., Nix, M., & Snyder, T. (2017). Are they paying attention? Students' lack of motivation and attention potentially threaten the utility of course evaluations. *Assessment & Evaluation in Higher Education*, 42(3), 431-442. <https://doi.org/10.1080/-02602938.2015.1119801>
- Barrows, H. S. (1986). A taxonomy of problem based learning methods. *Medical Education*, 20(6), 481-486.
- Biggs, J. (2014). Constructive alignment in university teaching. *HERDSA Review of Higher Education*, 1, 5 -22. Retrieved July 15, 2023, from https://www.tru.ca/_shared/assets/Constructive_Alignment36087.pdf
- Biggs, J., & Collis, K. (1989). Towards a model of school-based curriculum development and assessment using the SOLO taxonomy. *Australian Journal of Education*, 33(2), 151-163. <https://doi.org/10.1177/168781408903300205>
- Biggs, J., & Tang, C. (2011). *Teaching for quality learning at university*. New York: McGraw-hill.
- Blenker, P., Trolle Elmholdt, S., Hedeboe Frederiksen, S., Korsgaard, S., & Wagner, K. (2014). Methods in entrepreneurship education research: A review and integrative framework. *Education + Training*, 56(8/9), 697-715. <https://doi.org/10.1108/ET-06-2014-0066>
- Boyas, E., Bryan, L. D., & Lee, T. (2012). Conditions affecting the usefulness of pre- and post-tests for assessment purposes. *Assessment & Evaluation in Higher Education*, 37(4), 427-437. <https://doi.org/10.1080/02602938.2010.538665>
- Castoldi, M. (2012). *Valutare a scuola. Dagli apprendimenti alla valutazione di Sistema*. Roma: Carocci.
- Dahler-Larsen, P. (2018) Qualitative Evaluation: Methods, ethics and politics with stakeholders. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of Qualitative Research*, Vol. 5 (pp. 867-886). Thousand Oaks, CA: Sage.
- Dochy, F., Segers, M., Van den Bossche, P., & Gijbels, D. (2003). Effects of problem-based learning: A meta-analysis. *Le-*

- arning and Instruction, 13(5), 533-568. [https://doi.org/10.1016/S0959-4752\(02\)00025-7](https://doi.org/10.1016/S0959-4752(02)00025-7)
- European Commission, D.-G. for E., Youth, Sport and Culture. (2019). *Key Competences for Lifelong Learning*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2766/569540>
- Flick, U. (2018). Triangulation. In N. K. Denzin and Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research, Vol. 5* (pp. 444-461). Sage. <https://doi.org/10.4135/9781526416070>
- Gijbels, D., Dochy, F., Van den Bossche, P., & Segers, M. (2005). Effects of problem-based learning: A meta-analysis from the angle of assessment. *Review of Educational Research, 75*(1), 27-61. <https://doi.org/10.3102/00346543075001027>
- Golding C., & Adam, L. (2016) Evaluate to improve: useful approaches to student evaluation. *Assessment & Evaluation in Higher Education, 41*(1), 1-14. <https://doi.org/10.1080/02602938.2014.976810>
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. New York: Routledge.
- Hung, W. (2009). The 9-step problem design process for problem-based learning: Application of the 3C3R model. *Educational Research Review, 4*(2), 118-141. <https://doi.org/10.1016/j.edurev.2008.12.001>
- Koenen, A. K., Dochy, F., & Berghmans, I. (2015). A phenomenographic analysis of the implementation of competence-based education in higher education. *Teaching and Teacher Education, 50*, 1-12. <https://doi.org/10.1016/j.tate.2015.04.001>
- Knapp, J., Zeratsky, J., & Kowitz, B. (2016). *Sprint: How to solve big problems and test new ideas in just five days* (First Simon&Schuster hardcover edition). Simon & Schuster.
- López-Núñez, M. I., Rubio-Valdehita, S., Armuña, C., & Pérez-Urria, E. (2022). EntreComp Questionnaire: A Self-Assessment Tool for Entrepreneurship Competencies. *Sustainability, 14*(5), 2983. <https://doi.org/10.3390/su14052983>
- Mortari, L., & Silva, R. (2020). Valutare un Teaching Program attraverso l'esperienza degli alunni: Una ricerca empirica che offre stimoli alla riprogettazione didattica. *ITALIAN JOURNAL OF EDUCATIONAL RESEARCH, 25*, 137-150. <https://doi.org/10.7346/SIRD-022020-P137>
- Morselli, D. (2018). Teaching a sense of initiative and entrepreneurship with constructive alignment in tertiary non-business contexts. *Education + Training, 60*(2), 122-138. <https://doi.org/10.1108/ET-06-2017-0093>
- Morselli, D., & Gorenc, J. (2022). Using the EntreComp framework to evaluate two entrepreneurship education courses based on the Korda Method. *The International Journal of Management Education, 20*(1), 100591. <https://doi.org/10.1016/j.ijme.2021.100591>
- Mulder, M., & Winterton, J. (2017). Introduction. In M. Mulder (Ed.), *Competence-based Vocational and Professional Education* (Vol. 23, pp. 1-43). Springer International Publishing. https://doi.org/10.1007/978-3-319-41713-4_1
- OECD. (2018). *The future of education and skills: Education 2030: The future we want*. OECD Publishing. Retrieved December 10, 2023, from [https://www.oecd.org/education/2030/E2030%20Position%20Paper%20\(05.04.2018\).pdf](https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf)
- Osterwalder, A., Pigneur, Y., Bernarda, G., Smith, A., & Papadacos, P. (2014). *Value proposition design: How to create products and services customers want. Get started with*. Wiley.
- Paniagua, A., & Istance, D. (2018). *Teachers as Designers of Learning Environments: The Importance of Innovative Pedagogies*. OECD. <https://doi.org/10.1787/9789264085374en>
- Ravitch, S. M., & Carl, N. M. (2021). *Qualitative research: Bridging the conceptual, theoretical, and methodological* (Second edition). Sage.
- Richter, N., Schildhauer, T., & Jackson, P. (2018). Meeting the innovation challenge: Agile processes for established organisations. In N. Richter, P. Jackson, & T. Schildhauer (Eds.), *Entrepreneurial innovation and leadership* (pp. 109-121). Cham: Palgrave MacMillan. <https://doi.org/10.1007/978-3-319-71737-1>
- Savery, J.R. (2006). Overview of problem-based learning: Definitions and distinctions. *The Interdisciplinary Journal of Problem-Based Learning, 1*(1), 9-20. <https://doi.org/10.7771/1541-5015.1002>
- Sprintlab. (2021). Javelin Board: Cos'è, A Cosa Serve, Come Compilarla. *Blog.Sprintlab.It*. <https://web.archive.org/web/20230923204251/https://blog.sprintlab.it/javelin-board/>
- Viganò, R. (2020). Valutare l'insegnamento nell'istruzione superiore. A cosa serve veramente? *Giornale Italiano della Ricerca Educativa, 13*(24), 120-137. <https://doi.org/10.7346/SIRD-012020-P120>
- Wangsa, K., Chugh, R., Karim, S., & Sandu, R. (2022). A comparative study between design thinking, agile, and design sprint methodologies. *International Journal of Agile Systems and Management, 15*(2), 225-242. <https://doi.org/10.1504/IJASM.2022.124916>
- Yanchar, S. C. (2011). Using numerical data in explicitly interpretive, contextual inquiry: a 'practical discourse' framework and examples from Engeström's research on activity systems, *Theory & Psychology, 21*(2), 179-199. <https://doi.org/10.1177/0959354310393777>
- Yin, R. K. (2014). *Case study research: Design and methods* (Fifth edition). Sage.